

JUNE 22, 1935

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# Railway Age

FOUNDED IN 1856



## UNITCAST

**CONSTRUCTION  
WITH ALLOY STEEL**



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CAPACITY WITH HEAP — 2590 CU. FT.

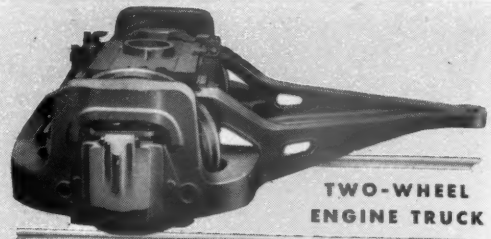
THIS CAR WILL BE SHOWN IN CHICAGO THE WEEK OF JUNE 24th, 1935

THE UNITCAST CO.

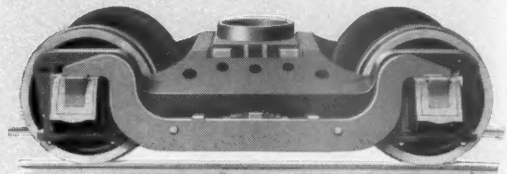
TOLEDO

# For Many Years —

COMMONWEALTH CAST  
STEEL DEVICES HAVE  
PROVEN THEIR GREAT  
ECONOMY AND EFFI-  
CIENCY ON THOUSANDS  
OF LOCOMOTIVES AND  
TENDERS. . . .



TWO-WHEEL  
ENGINE TRUCK



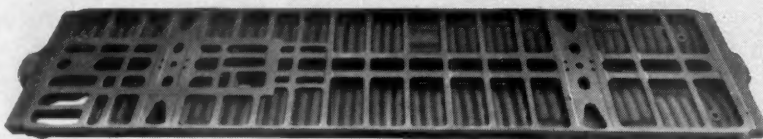
FOUR-WHEEL ENGINE TRUCK



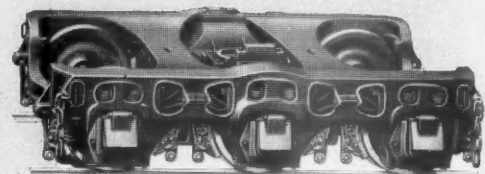
TWO-WHEEL DELTA-TYPE TRAILER TRUCK



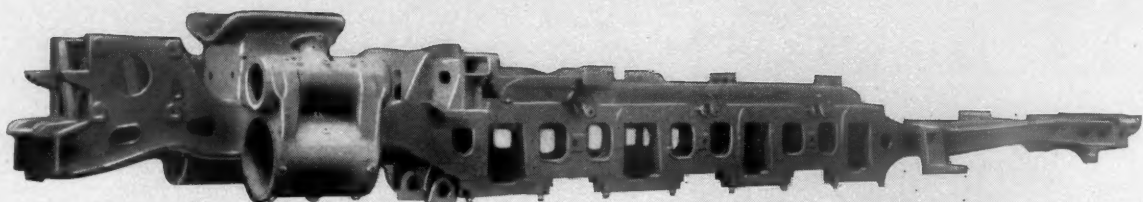
FOUR-WHEEL DELTA-TYPE TRAILER TRUCK



WATER-BOTTOM TENDER FRAME



SIX-WHEEL TENDER TRUCK



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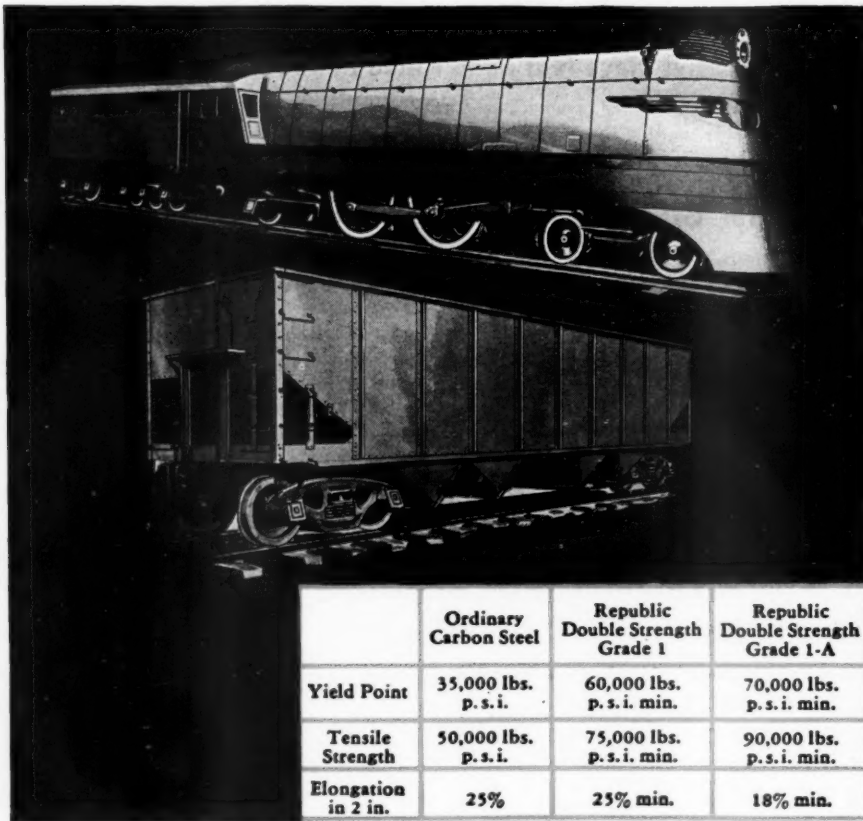
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# Politics vs. "Planned Economy"

This paper always has taken the position that democratic government and planned economy are incurably incompatible. The theory of a planned economy involves government regulation and control of all production and distribution. It assumes that government will exercise its authority solely to promote the economic welfare of the public. In actual practice, government in a democratic country invariably is influenced or controlled by political considerations in dealing with economic problems, the result being glaring inconsistencies, and even conflicts, between its ostensible principles and purposes and its actual performance. No better illustration could be afforded than the passage last week by Congress and the signing by President Roosevelt of the resolution to extend the co-ordination provisions of the Emergency Transportation Act.

### No "Planned Economy" for Transportation

If there is any industry a consistent and constructive economy for which the government should already have planned and in process of being carried out it is that of transportation. It has had thirty years of experience in regulating the railways. There has been a decade of constant investigation and discussion of the competitive relations between the railways and other carriers. The present administration is the first sponsor in Washington of a planned economy for all industry. It secured the passage of the Emergency Transportation Act two years ago as part of its general program for establishing and carrying out a planned economy. And yet the passage by Congress, on President Roosevelt's recommendation, of the resolution to extend the Emergency Transportation Act for a year, was plainly dictated largely by political considerations, and subjects the railways for another year to a law which is directly conflicting in its purposes, and which violates every principle which the advocates of a planned economy claim that government would observe in formulating and carrying out such an economy. If there is to be any semblance of consistency in the government's transportation policy, Congress must pass, before it adjourns, some very important legislation for the regulation of carriers by air, highway and water. As matters now stand the government's transportation policy is utterly inconsistent and conflicting from any standpoint excepting, perhaps, a political one.

### To Co-ordinate or Not to Co-ordinate?

The chief purposes of the Emergency Transportation Act, when it was originally proposed in 1933, were to promote the elimination of railroad "wastes and un-

necessary expense" and to provide for study of other means of "improving conditions surrounding transportation in all its forms" with a view to further legislation to that end. The title and provisions of the act show that co-ordination between the railroads themselves, and between them and other carriers, was intended to be the principal means of accomplishing its purposes. By re-enacting the act without changing its title or provisions Congress has declared that it is still its policy to encourage transportation co-ordination. The organization of the Association of American Railroads last fall has greatly reduced any needs that may previously have existed for government pressure to promote railroad co-ordination. The most conspicuous lack of co-ordination was before the act was passed, and still is, not between the railroads, but between them and other carriers.

Co-ordinator Eastman, with the backing of President Roosevelt, has had bills introduced to promote co-ordination of the railways and other carriers by subjecting other carriers to regulation of their service and rates by the Interstate Commerce Commission similar to that now applied to the railways. The wastes due to insufficient railroad co-ordination are trifling compared with the wastes and abuses resulting from present competition between the excessively regulated railroads and unregulated carriers. The Emergency Transportation Act subjects the railways to regulation by the Co-ordinator in addition to that to which they were subject before it was passed. Therefore, nothing could be more inconsistent than for Congress to extend the legislation for railroad co-ordination and then delay, or fail to pass, the legislation recommended by Mr. Eastman for the regulation of other carriers. There cannot possibly be any real measure of co-ordination of the service and rate making of different carriers until there has been established co-ordination in their regulation. If continuance of regulation, especially to promote railroad co-ordination, is in the public interest, then plainly regulation to promote co-ordination of all carriers would be in the public interest.

### Why Only Railway Legislation?

Why, then, does not Congress pass the legislation proposed by Mr. Eastman, and recommended by the President, for the regulation of other carriers as unhesitatingly and promptly as it passed the legislation recommended by them for extension of the application of the Emergency Transportation Act to the railways? Does Congress really favor co-ordination in transportation, or was it inspired by an entirely different motive

in passing the resolution to extend the Emergency Transportation Act with virtually no consideration of its merits? Apparently its real motive is to be found in the labor provisions of the act. They were inserted at the instigation of the railway labor leaders, and restrict reductions in employment "by reason of any action taken pursuant to the authority of this title."

Co-ordinator Eastman has construed this language to prohibit reductions of employment that might result from almost any kind of railroad co-ordination, whether directly due to the operation of the act, or such as would have been effected voluntarily by two or more railways if it never had been passed. Consequently, throughout the two years that it has been in effect the act as interpreted has prevented economies by, in effect, prohibiting them from being made in the very way in which its title prescribes that they shall be made. Congress knew this. It had been repeatedly pointed out to it by Co-ordinator Eastman. Apparently the real reason why Congress extended the act for a year was that the labor leaders demanded continuance of its prevention of economies that might directly, although probably only temporarily, involve reduction of employment. In other words, the act has been extended to prevent the very economies that it is ostensibly its purpose to cause.

#### **Why Continue Expanding Transportation Plant?**

The question as to what is the government's policy regarding transportation—whether to foster co-ordination or hinder it, whether to reduce or increase the total burden of transportation costs that must be borne by the public, is raised by others of its policies. The purpose of every policy adopted either by the government, or by the managements of transportation agencies with the government's sanction, should be furtherance of the public interest by making transportation service as good and cheap as practicable. By continuing to make large appropriations for inland waterway and commercial highway construction the government is stimulating the expansion of the already greatly over-expanded transportation plant. Why extend legislation ostensibly to foster railway co-ordination, and, at the same time, re-adopt provisions and make appropriations tending further to expand that plant and increase the expense of maintaining and operating it?

Co-ordination is entirely pointless excepting as a means of saving investment and operating expense by reducing competitive plant and service. Why legislate for co-ordination to reduce railway plant and service, and at the same time legislate for public expenditures to increase waterway and highway plant to render a more expensive service? Apparently the only answer is ignorance, politics or both.

#### **How Co-ordinator Can Help**

Inasmuch as extension of the labor provisions of the Emergency Transportation Act for political reasons seemingly was inevitable, this paper does not much regret that it has been accompanied by extension of the

functions of Co-ordinator Eastman. During his sixteen years of service on the Interstate Commerce Commission, and especially during his two years of service as Co-ordinator, Mr. Eastman has demonstrated ability, intellectual honesty and courage. His research as Co-ordinator has accumulated a vast fund of information adequate use of which may contribute largely to clarifying the entire transportation problem. As a government official, he can use this information more effectively to educate public opinion than any railway official or organization could. That he will use it honestly and courageously for this purpose, as well as to stimulate action by the carriers, is indicated by his entire record as a public official.

Consistency will require him, in advocating adoption by the railways of important policies he favors, to point out again and again, as he already has done, the way railway managements are handicapped by unfair and unwise government policies. The effects of present transportation policies of both the national and state governments, in imperiling the future of the railways and enormously inflating the total cost of transportation, need comprehensive and detailed exposure. Only through such exposure can it be made politically expedient for public men to favor imperatively needed changes; and we hope and believe that the information Mr. Eastman has gathered and his interpretations of it will help to bring about these changes.

#### **Railways and the Labor Provisions**

Meantime, Congress, by extending the labor provisions of the Emergency Transportation Act, has, in effect, challenged railway managements to do more about these provisions than they heretofore have done. Mr. Eastman has virtually suggested that they go ahead with every kind of co-ordination tending to effect economies, and furlough, but continue to pay, employees thereby rendered needless. This would be one way of demonstrating the iniquitous tendency of these provisions to cause unnecessary expense. But the railways need at least as many employees as they now have, and therefore should be able to replace those laid off because not needed with employees that are needed. Recent decisions of the United States Supreme Court indicate that the labor provisions of the Emergency Transportation Act are unconstitutional. It would seem, therefore, that what the railways ought to do is to test their constitutionality in the Courts. Their nullification would make it possible to effect economies where they are practicable and to use the money saved to employ men where they are needed.

#### **An Illustration of "Planned Economy"**

Meantime the great significance of the government's policy, or lack of policy, regarding transportation should not be disregarded. Economic policies dictated by political considerations are certain to have the purpose of promoting the interests of organized minorities at the expense of the public. The real purpose of

Congress in extending the Emergency Transportation Act was to placate the railway labor leaders because of their supposed political influence. The effective influence that has thus far prevented legislation for the regulation of other carriers is political. The main purpose of the large expenditures still being made on inland waterways and commercial highways is to win votes in the territories in which the expenditures are being made.

If, because of politics, the planned economy won't work even in transportation, over which the government unquestionably has the broadest constitutional authority that it has as regards any industry, how can it rationally be hoped that politics would not dictate all the government's policies under a planned economy for all industry?

## Why the Delay on Grade Crossing Work?

Of all the forms of public works carried on during the last two years for the purpose of stimulating employment, none has been more cordially received in all quarters than the separation and protection of railway-highway crossings. The reasons for this are not hard to find. The benefits to be derived are tangible and permanent, and accrue to the advantage of all people in all parts of the country. It is recognized, also, that the expenditure of federal funds for this purpose serves but to advance a program of sorely needed improvements that will of necessity be carried out eventually by some means.

If a proposal to build grade separations or provide grade crossing protection exclusively at public expense had been made 15 or even 10 years ago, it would have aroused a storm of criticism on the ground that the railways would be the primary beneficiaries and that they should be required to bear all or nearly all of the cost. But public sentiment has changed; popular opinion is now definitely in accord with the decision of the Supreme Court of the United States in the case of the Nashville, Chattanooga & St. Louis versus the Tennessee State Highway commission, in which the court held that the users of the highways gain the principal benefit from grade separation.

Widespread approbation of grade separation and protection as a function of the government arises also from the success that has attended the prosecution of the work during the last two years. Co-operation between the railways and the state highway authorities under a thoroughly workable plan of procedure formulated by Thomas H. MacDonald, chief of the U. S. Bureau of Roads, has produced results. Projects have been agreed upon, plans have been approved, contracts awarded and the work done in a thoroughly business-like fashion. There can be no question but that the

general popularity of improvements designed to reduce the hazard at grade crossings and the record of accomplishment during the last two years have been responsible for their inclusion among the types of projects specifically authorized under the terms of the Emergency Relief Appropriation Act of 1935.

In view of the thoroughgoing effectiveness of the machinery for the furthering of projects for grade separation under the terms of the federal appropriations of 1933 and 1934, the signing of the appropriation bill of 1935 was looked on as a signal for an immediate acceleration in the progress on such work. The states and the railways had arrived at tentative agreements covering a large number of projects and were ready to go. But this sanguine view is being replaced by one of disappointment. More than two months have passed and actual construction is not yet under way.

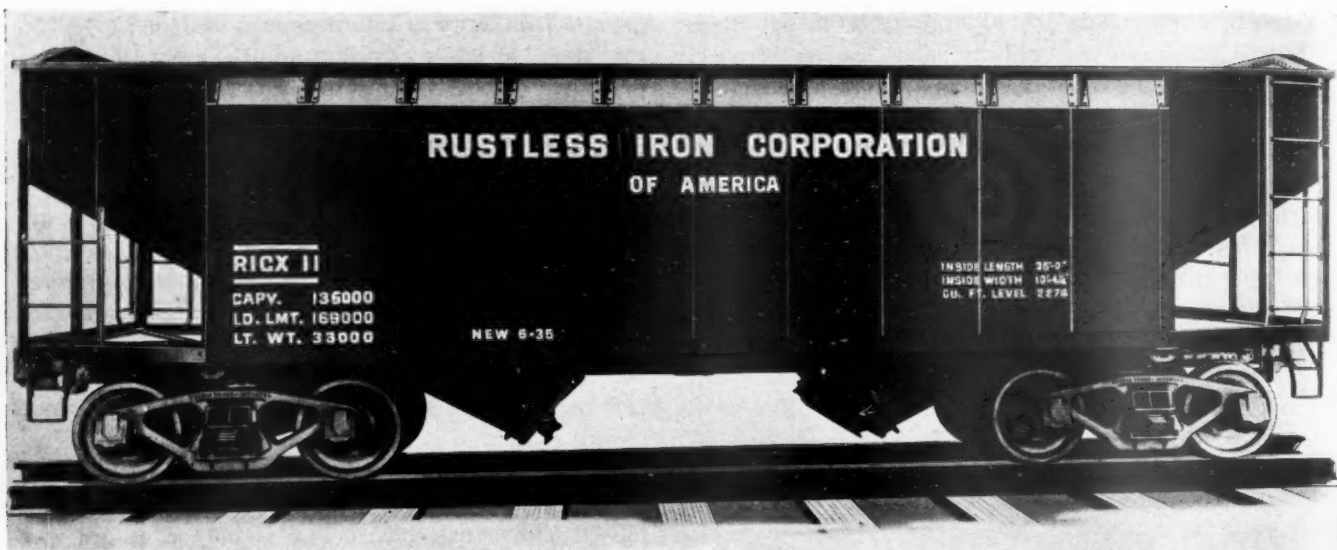
Like the earlier appropriations for public works, the present one is designed primarily to relieve unemployment, and also, as before, its enactment has given rise to sharp differences of opinion among the President's advisors with respect to the extent that prudent investment should be sacrificed to the end of providing the maximum of direct labor, and in this case it now appears that those who urge maximum man-hours regardless of cost and of the effectiveness of the results accomplished, have gained the President's support.

To remove as many employable persons as possible from the relief rolls is a laudable endeavor, but to effect this objective by imposing too drastic rules for the recruiting of labor from relief rolls for work requiring a considerable proportion of craftsmen skilled in various trades and by fixing incongruous ratios between the expenditures for direct labor and for materials, would result not only in a pronounced increase in the cost of the individual projects, but, still more important, would also seriously disrupt an estimably devised and thoroughly tried plan of procedure under which it would have been possible to get effective work started quickly.

Recognizing these facts, a determined effort is being made through the Bureau of Public Roads to prevent such unfortunate consequences which might result under rules which have already been established in connection with the 1935 appropriation. It is understood that a plan is now under consideration which would make it possible to adjust, as necessary, the labor-materials ratio already set up, in order to permit carrying out effective work, where a state will guarantee to underwrite employment for those on relief rolls to the extent that would otherwise be accomplished through the labor requirements already specified.

The record of achievement in the prosecution of projects for grade separation and protection during the last two years lends high credit to the President and to those members of his staff who bore the administrative responsibilities which it involved. It would be unfortunate indeed if efforts to continue this work under the plan now being devised should result in its degeneration into a form of glorified CWA.



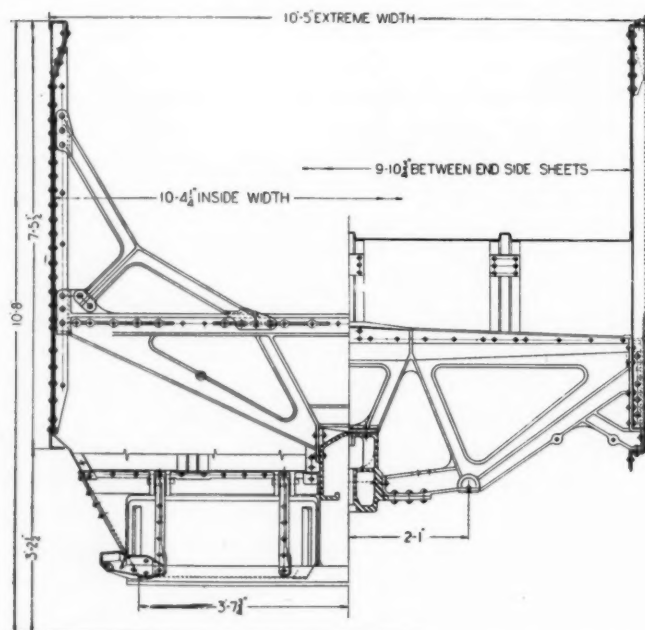


Light-Weight Hopper Car Built for the Rustless Iron Corporation

# Light-Weight Hopper Car for Rustless Iron Corporation of America

Steel castings of light section have been combined with high-tensile alloy sheets to produce a car with high ratio of revenue load to total weight

**A**LTHOUGH the ultimate life of a hopper car is generally regarded as being limited by the life of its underframe, corrosion in cars used for the transportation of coal, particularly of high sulphur content, has so destructive an effect on such car parts as



Half Cross-Sections Showing Side-Sheet and Hopper Construction

slope sheets, hoppers, crossbearers, center ridges and the lower side sheets that periodical renewals are necessary, with consequent excessive maintenance costs. A hopper car, embodying several unique features, and aimed at the elimination of excessive maintenance charges, has been designed by The Unitcast Company, Toledo, Ohio, for the Rustless Iron Corporation of America, Baltimore, Md. One of these cars has recently been built at the plant of the Ralston Steel Car Company, Columbus, Ohio.

The purpose in building the twin hopper car described in this article was to demonstrate the economic justification for the use of high-strength rustless steel in lighter than conventional gages in the construction of hopper-car bodies which are subjected to severe corrosive influences. The design aimed at a high ratio of revenue load to total weight without sacrifice of any of the structural strength of the conventional car. The car which has been constructed has a total light weight of approximately 33,000 lb. and a maximum revenue load of approximately 136,000 lb., providing a revenue load to total weight percentage of 81.

## New Structural Rustless Steel

The car body, including essential members such as side and slope sheets, hopper sheets, end sheets, and bottom and top angles, is fabricated of RR-11, a new structural rustless steel developed by the Rustless Iron Corporation of America, in co-operation with the American Rolling Mill Company, which produced the sheets and plates. This is a very low carbon stainless steel,

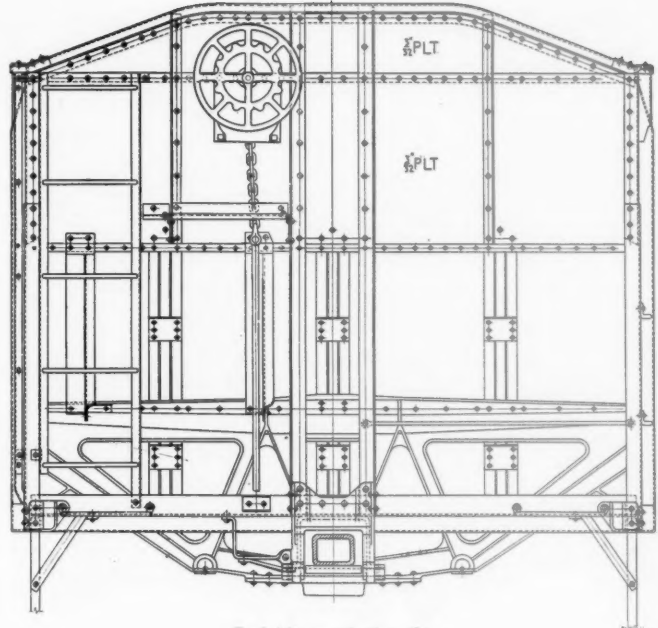
containing about eleven per cent of chromium. It is made by patented processes involving the direct reduction of chrome ore, and its improved fabricating qualities are attributed to these special processes, as well as to its composition. The material may be used in either riveted or welded construction, and has a tensile strength of from 80,000 to 120,000 lb. per sq. in., varying to meet requirements. Typical physical properties are as follows:

Ultimate tensile strength.....	90,000 lb. per sq. in.
Yield point .....	65,000 lb. per sq. in.
Elongation in 2 in.....	15 to 25 per cent
	(dependent on gage)
Hardness .....	185 Brinell
Izod impact .....	90 ft.lb.

The cast structural assembly consists of a solid cast-steel center sill with integral center plates to which are attached, by means of riveted joints, the body bolsters, crossbearers, crossbearer arms and hopper frames—all unit castings. The weight of this assembly is 6,850 lb. The cast-steel hopper frames act as additional crossies, increasing the rigidity of the underframe, and carry door-hinge lugs which prevent the doors from getting out of line once they are fitted up in the proper locations. The cast-steel door frames are designed to insure against loss of lading through the doors by reason of the fact that the weaving of the car is said not to change the door fits. All of the cast-steel members used in the superstructure of the car were furnished by The Unitcast Company.

#### The Underframe

The backbone of this car consists of a Unitcast center sill, a single steel casting extending the full length of the car, which weighs 4,360 lb., is 12 in. wide by 14 in. deep at the center, and has a cross-sectional area of 26.75 sq. in. The ratio of unit stress to end load in the bottom fibers of this center sill is .04. The body bolsters are attached by riveting at the truck-center location, and at the middle of the car the cross-bearers are attached to the center sill in a similar fashion, and the crossbearer arms, in turn, are riveted to the crossbearers. Midway between the crossbearers and the body-bolster flanges are cast as an integral part of the center sill to which the inner ends of the hopper-door frames are riveted, as well as the cross-ridge and slope sheets. The top and bottom side and end sills and side stakes consist of RR-11 rolled shapes and pressings. The side stakes are on the inside of the side sheets. The RR-11



End View of the Car

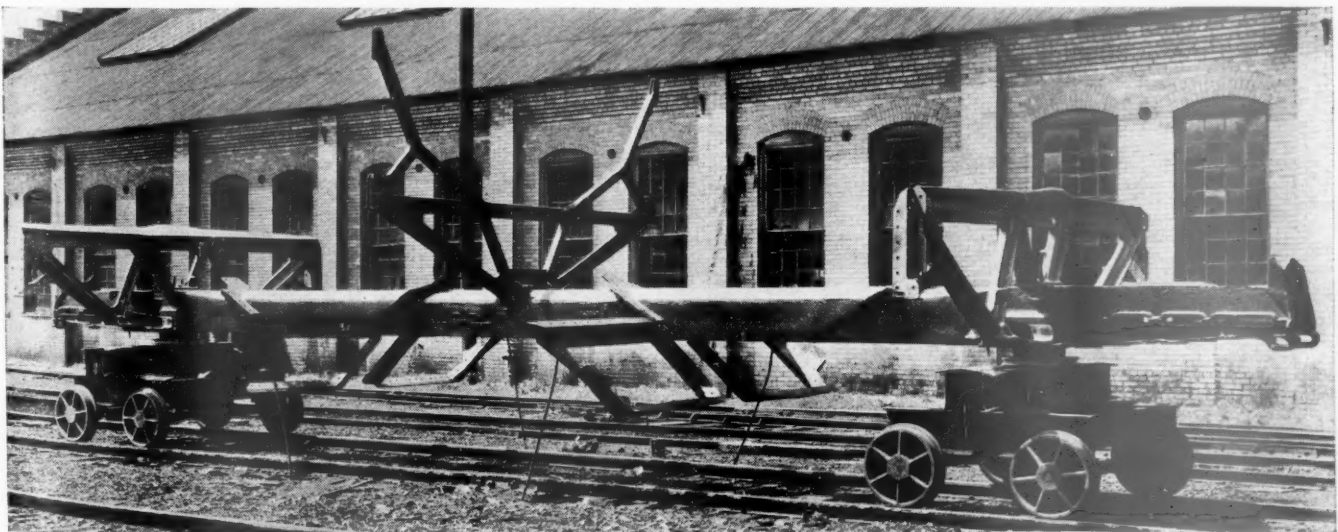
sheets used in the body of this car are of the following thicknesses:

Sides and ends.....	$\frac{3}{32}$ in.
End floor sheets, inside hopper sheets and intermediate	
Stakes .....	$\frac{1}{8}$ in.
Cross-ridge sheets .....	$\frac{1}{8}$ in.
Outside hopper sheets.....	$\frac{1}{8}$ in. and $\frac{3}{16}$ in.
Hopper doors .....	$\frac{3}{32}$ in.
Floor stiffeners .....	$\frac{3}{32}$ in. and $\frac{3}{16}$ in.
End stiffeners .....	$\frac{3}{16}$ in.
Bolster stakes, crossbearer stakes, corner posts, diagonal	
braces, side sills, end sills and coping section.....	$\frac{1}{4}$ in.

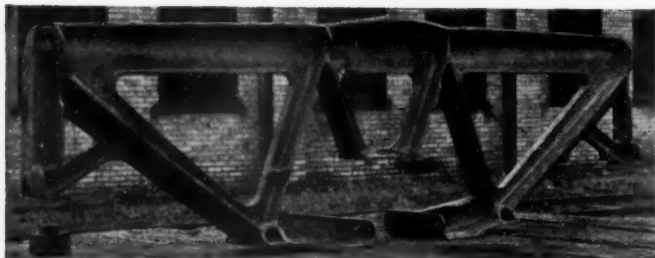
Liberal use was made of stiffening members, there being 16 intermediate side stakes of the conventional U-shape, four between each bolster and crossbearer. The floors are strengthened by the use of three U-shaped stiffeners extending longitudinally through the end floor sheets and cross-ridge sheets. The center sill is so designed as to be self-clearing where it is exposed to the interior of the car without the use of additional hood sheets.

#### Trucks and Brake Equipment

The trucks on this car are the four-wheel spring-plankless type, a recent development of the cast-steel truck manufacturers. They have open-hearth steel



The Unitcast Structural Assembly Showing Center Sill and Cross Members



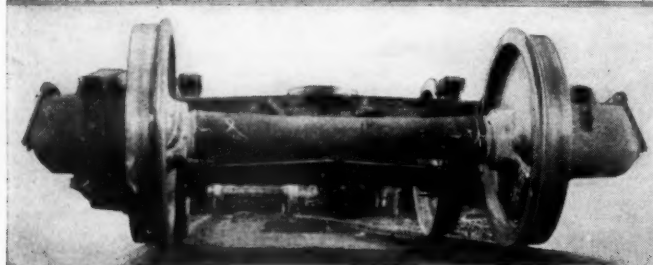
One of the Crossbearers



The Crossbearer Arm

axles with 5½-in. by 10-in. journals spaced on 5-ft. 6-in. truck-wheel centers. The two trucks are 26 ft. from center to center. One-wear wrought-steel wheels, 33 in. in diameter, furnished by the Armco Railroad Sales Company, are used.

These trucks have been designed with a view to maximum reduction in weight and, to accomplish this, are equipped with the spring-plankless type, double-truss, self-aligning side frames of light section, high tensile cast steel, meeting A.A.R. HT 35 specifications. The truck bolsters are of the same material. The engaging surfaces between bolster and side-frame columns are shaped cylindrically and terminate in radial guiding steps so that, in the absence of the spring-plank, engagement between the bolster and the side frame is maintained with large, uniform bearing contacts. A bracket cast integral with the side frame provides for the attachment of brake-beam safety devices. The bolsters and the side frames were furnished, respectively, by the Buckeye Steel Castings Company and the American Steel Foundries. The truck springs are the non-harmonic Coil-Elliptic type supplied by the American Locomotive Company, Railway Steel Spring Division.



The Trucks Under This Car Are of Special Light-Weight Design

Wine side bearings are used. Open-hearth-steel brake levers, hangers and bottom connectors form a part of the truck brake rigging. Hangers and retainers are supplied by the Schaeffer Equipment Company. The brake equipment on the car is the Westinghouse Air Brake Company automatic empty-and-load equipment,

#### Principal Dimensions and Characteristics

Length over striking faces.....	35 ft. 10½ in.
Length, coupled .....	38 ft. 8½ in.
Length inside .....	35 ft. 0 in.
Width inside .....	10 ft. 4¾ in.
Length, center to center of trucks.....	26 ft. 0 in.
Height, top of side above rail.....	10 ft. 8 in.
Total light weight of car.....	33,000 lb.
Total loaded weight (maximum).....	169,000 lb.
Maximum revenue load .....	136,000 lb.
Per cent, revenue load to total loaded weight.....	80.5
Load density to give full axle load, lb. per cu.ft.....	52.89
Weight of plates in car.....	4,450 lb.
Weight of shapes and pressings.....	3,700 lb.
Weight of bars and forgings.....	1,100 lb.
Weight of Unicast underframe complete.....	6,850 lb.*
Weight of couplers, yokes and draft gear.....	2,363 lb.
Weight of air brakes, specialties and miscellaneous parts.....	1,575 lb.
Weight of two trucks, complete.....	13,280 lb.*
Cubic capacity, level full.....	2,278 cu.ft.
Cubic capacity, with heap.....	2,590 cu.ft.

\* Actual weights; all other weights estimated.

and the brake beams on the trucks are A. A. R. standard No. 3, a high capacity beam suitable for use with the empty and load brake. The Wine Railway Appliance Company brake balancer is used in connection with this



The Hopper-Door Frames

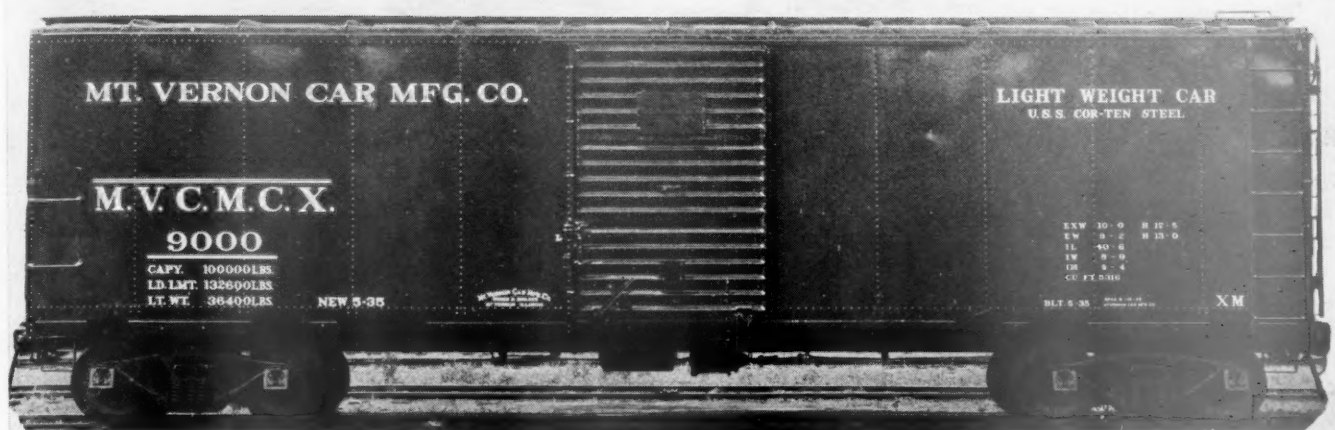
equipment. The car is fitted with Ajax hand-brake mechanism.

In the coupler and draft-gear arrangement high-tensile light-weight couplers and yokes have been used. The draft gear is the Waugh-Gould type with selective-travel attachments. The yokes were supplied by the Buckeye Steel Castings Company and the coupler assembly, of A. A. R. swivel-butt type, was furnished by the National Malleable and Steel Castings Company, with butts manufactured by the Gould Coupler Company.

This car will be at the Union Station at Chicago on June 25, 26 and 27 for inspection.

WORK HAS BEEN STARTED by the Edward G. Budd Manufacturing Company, Philadelphia, Pa., on engineering plans for 20 two-car streamlined, stainless steel trains to be built in France for the State Railways of France. The trains will cost approximately \$1,200,000 and will be constructed by the Carel-Fouché Company, which has been licensed to use the Budd process of fabricating stainless steel and other patents employed in the building of streamlined trains in the United States. The French trains, the announcement says, will incorporate the best features of the Burlington Zephyrs and the Flying Yankee of the Boston & Maine and Maine Central, and will be similar to these in basic construction; they will be air-conditioned and capable of carrying 220 passengers each.





Mt. Vernon 50-Ton Light-Weight Box Car Built of Cor-Ten

## Mt. Vernon Builds Light Box Car

Use of alloy steel permits saving 7,900 lb. over  
conventional A.A.R. 1932 design

THE Mt. Vernon Car Manufacturing Company has recently completed a light-weight 50-ton steel-sheathed box car along conventional lines of the A. A. R. 1932 design, except that Cor-Ten steel is substituted for the nearest practical approximate section in strength and high-tensile steel castings have been used in couplers and coupler yokes. The auxiliary reservoir and the single-strength train pipe also are made of Cor-Ten steel.

On the trucks, high-tensile cast-steel side frames and truck bolsters are used, also light-weight brake beams

use of Cor-Ten or similar alloy steel. The underframe and superframe are built of Cor-Ten steel plates, sheets, shapes and bars throughout, 9,716 lb. of alloy steel replacing 13,395 lb. of plain carbon steel, making a saving of 3,679 lb., or 27.5 per cent on structurals.

There is a further reduction by the use of Cor-Ten or similar alloy steel on the following specialties: Air brakes, Cor-Ten steel reservoir, Dreadnaught ends, Murphy improved solid steel roof, Cor-Ten single-strength train pipe, rivets and bolts, Youngstown corrugated doors and Camel door fixtures. This brings a total saving on account of alloy rolled steel up to 5,410 lb., or 26.8 per cent. The use of high-tensile cast steel for the body center plates, couplers, coupler yokes, truck

### Other Standard Specialties Used on the Mt. Vernon Light-Weight Box Car

Bottom rod guards—Cresco, Universal type	Chicago Railway Equipment Co., Chicago
Brake-beam supports and safety device—Cresco type	Chicago Railway Equipment Co., Chicago
Brake-beam hanger retainers—Mobile Type A	Illinois Railway Equipment Co., Chicago
Brake shoes—A.A.R. cast iron, steel reinforced	
Brake step—Viloco pressed type	Viloco Railway Equipment Co., Chicago
Draft gear—Class A-22-XB	W. H. Miner, Inc., Chicago
Grip nuts	Grip Nut Co., Chicago
Hand brakes—High-power, vertical-wheel type	Equipment Specialties Co., Chicago
Hand-brake chain	Nixdorf-Krein Mfg. Co., St. Louis, Mo.
Train-line pipe clamp—Lock-Tite	Lox-On Corp., New York
Pipe clamps for 3/4-in. retainer pipe	Illinois Railway Equipment Co., Chicago
Striking casting and front draft lugs combined	Burnside Steel Foundry Co., Chicago
Truck side bearings—Roller type	A. Stucki Co., Pittsburgh, Pa.
Truck springs—Outer coils only	American Locomotive Company (Railway Steel Spring Div.), New York
Truck-spring plates	Geometric Stamping Co., Cleveland, Ohio
Uncoupling rigging—Imperial rotary-type	Union Metal Products Co., Chicago

and light cast-iron specially-annealed wheels weighing approximately 665 lb. each. The weight of the trucks is 13,660 lb., a saving of about 2,040 lb. per car. The light weight of the car is 36,400 lb., which represents a saving of 7,900 lb.

The greater portion of this reduction is due to the



The End Construction

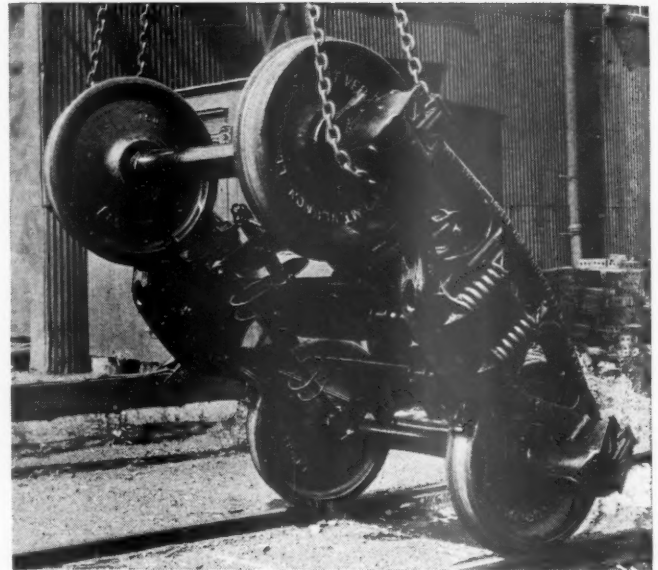
bolsters and truck side frames effected a saving of 1,064 lb., or 19.5 per cent.

There was a further reduction of 1,426 lb. due to using special material or design for the following items: 33-in. light-weight cast-iron annealed wheels, 665 lb. each; light-weight Creco brake beams; coupler centering device; journal bearings and elimination of the spring plank. The federal co-ordinator's recent survey

**Weight Savings as a Result of Using (A) Cor-Ten Steel Plates and Shapes; (B) Alloy Cast-Steel Specialties; and (C) Other Specialties of Light-Weight Design**

	Weight per car, lb.		Saving in weight	
	Conventional type	Alloy-Steel type	Lb.	Per Cent
<b>A—SPECIALTIES REDUCED IN WEIGHT BY USING COR-TEN STEEL:</b>				
Air brakes—Westinghouse Type-AB, with alloy steel reservoir.....	671.5	509.5	162.0	24.1
Doors—Youngstown corrugated type with Camel roller lift side-door fixtures, furnished by Camel Sales Company.....	1,532.0	1,173.0	359.0	23.4
Ends—Dreadnaught two-section type, furnished by Union Metal Products Co. ....	2,000.0	1,500.0	500.0	25.0
Journal-box lids—Asco, pressed type, furnished by Allegheny Steel Company.....	47.6	37.8	9.8	20.6
Train-line pipe, steel, furnished by National Tube Company.....	149.8	113.6	36.2	24.2
Roof—Murphy solid-steel type, furnished by Standard Railway Equipment Company.....	1,742.0	1,260.0	482.0	27.7
Steel—Structurals, plates and bars, furnished by Illinois Steel Co., sheets by American Sheet & Tin Plate Co.				
Plates, sheets and structurals..	9,607.0	6,787.0	2,820.0	29.4
Z-center sills.....	2,966.0	2,381.0	585.0	19.7
Bars.....	822.0	548.0	274.0	33.3
Additional miscellaneous items, such as follower plates, draft keys, grab irons, etc., that could not be changed in weight 796.7 lb.				
Small rivets 3/4 in. and 1/2 in. dia. Cor-Ten, furnished by Gary Screw & Bolt Co.....	None	174.0	....	...
Cor-Ten rivets 3/4 in. dia. made by car builder.....	None	170.0	....	...
Plain rivets.....	550.0	73.0	133.0	24.2
Bolts—Lewis Seal-Tite Cor-Ten, 3/4 in. dia. for running boards and floor, furnished by Lewis Bolt & Nut Co.	None	32.0	....	...
Plain steel bolts.....	108.0	27.0	49.0	45.4
Total saving by use of Cor-Ten steel.....	20,196.0	14,786.0	5,410.0	26.8
<b>B—SPECIALTIES REDUCED IN WEIGHT BY USING ALLOY CAST STEEL:</b>				
Body center plate, A.A.R. design modified.....	160.0	114.0	46.0	28.8
Couplers—A.A.R. Type-E, 6 1/4 in. by 8-in. shank, rotary bottom operating	890.0	698.0	192.0	21.6
Coupler yokes, A.A.R. vertical type.	420.0	294.0	126.0	30.0
Truck bolsters—Double-truss, self-aligning.....	1,596.0	1,222.0	374.0	23.4
Truck side frames—5 1/2 in. by 10-in. integral box, double-truss, self-aligning spring plankless type.....	2,390.0	2,064.0	326.0	13.6
Total saving by use of alloy cast steel.....	5,456.0	4,392.0	1,064.0	19.5
<b>C—SPECIALTIES REDUCED IN WEIGHT BY USING SPECIAL MATERIAL OR DESIGN:</b>				
Wheels—33-in. light-weight single-plate cast iron annealed.....	6,000.0	5,320.0	680.0	11.3
Brake beams—Creco special light-weight furnished by Chicago Railway Equipment Company.....	396.0	284.0	112.0	28.3
Coupler centering device—Union-type, made of high-tensile malleable iron, by the Union Metal Products Company.....	67.0	60.0	7.0	10.4
Journal bearings—Arctic No. 36 bronze, furnished by National Bearing Metals Corp.....	206.0	200.0	6.0	3.0
Spring plank—Steel plate not used on Cor-Ten car.....	396.0	None	396.0	100.0
Miscellaneous.....	225.0	None	225.0	100.0
Total saving by use of special materials.....	7,290.0	5,864.0	1,426.0	19.6
Grand total (A, B, and C Specialties).....	32,942.0	25,042.0	7,900.0	24.0

of cars for pooling shows that all of the steel box cars built by car builders from 1920 to 1934, inclusive, average 46,500 lb. This Mount Vernon car is 10,100 lb. lighter than the average steel-sheathed car of this type



The High-Tensile Truck Is Spring-Plankless

in existence at this time. It is 7,900 lb. lighter than the A. A. R. 1932 design of steel-sheathed car.

In producing this car, all existing A. A. R. standard details were observed throughout and all general dimensions of the car were held without change. The various sections were scaled down in thickness and sizes to the approximate equivalent strength to the original details of the car. In some cases, it was necessary to substitute pressed shapes for rolled sections.

The Mt. Vernon box car is 44 ft. 2 1/2 in. long between coupler pulling faces, 41 ft. 8 1/4 in. over striking castings and 30 ft. 8 1/2 in. between truck centers. Its extreme width is 9 ft. 11 1/8 in. and height 13 ft. 10 1/4 in. With clear inside dimensions of 40 ft. 6 1/16 in. long by 8 ft. 9 1/4 in. wide by 9 ft. 4 in. high, the car has a capacity of 3,316 cu. ft. The nominal weight-carrying capacity of the car is 50 tons, but the load limit is 132,600 lb. The actual and percentage weight savings as the result of using Cor-Ten steel plates and shapes, alloy cast-steel parts and other special light-weight parts are shown separately and in total in the table.

\* \* \*



A Freight Train Above the Inn Valley, Austria  
Branching off the Austrian Western Railway at Innsbruck, this mountain line climbs 3.5 per cent grades along slopes of the Inn Valley and serves several resorts in Austria and Bavaria. It was electrified in 1911.

# Pullman Produces Light Box Car Without Added Cost

Five tons of dead weight saved in 50-ton car featured by welded Cor-Ten steel construction

THE latest contribution of the Pullman-Standard Car Manufacturing Company to light-weight railway equipment is a 50-ton box car\* which meets the full interchange requirements and strength specifications of the Association of American Railroads, but weighs approximately five tons less than the A.A.R. standard box car, owing to the use of welded, Cor-Ten steel, body construction and special alloy-steel trucks. Referring to the table of comparative dimensions, it will be noted that the new car weighs 10,200 lb. less than the Chicago Great Western standard car, built about a year ago, and 11,800 lb. less than a former conventional steel double-sheathed box car. These substantial savings in dead weight are available for increased load-carrying capacity. Unusually large cubic capacity is also provided, as shown in the table, due primarily to the  $2\frac{5}{16}$  in. greater inside width, with the same outside dimensions. The most significant fact about the car design is that it permits saving 9,000 lb. of dead weight

high. The car body weighs 20,240 lb. and the trucks 13,960 lb., or a total of 34,200 lb. One reason for this unusually light weight is the extensive use of welding in the car construction which involves an estimated 22-per cent arc-welding, 54-per cent spot-welding and 24-per cent riveting, based on length of seam. Sides and ends, for example, are made of .05-in. and  $\frac{3}{32}$ -in. Cor-Ten steel sheets, respectively, fabricated on special horizontal jigs by spot-welding, but assembled in the car body by riveting at the corners, because this particular operation can be done cheaper and better by riveting. Similarly, roof sheets are joined to each other and to the carlines by spot-welding, the unit roof being secured to the car by riveting. Relatively heavier sheets and shapes are united by electric arc-welding.

## A.A.R. Z-Section Center Sills Used

The center sills are of the new A.A.R. Z-Section type, the use of alloy steel permitting the web and the

Welded Cor-Ten Steel Box Car  
Built by the Pullman-Standard Car  
Manufacturing Company



without any increase in cost over conventional steel construction, and 1,000 lb. more can be saved, if desired, with some additional cost.

The Pullman-Standard light-weight steel-sheathed box car is 44 ft.  $6\frac{1}{2}$  in. long over coupler pulling faces, 10 ft.  $2\frac{1}{2}$  in. wide over door hasp anchors, and 13 ft.  $10\frac{1}{16}$  in. high from the rails to the running boards. The distance between truck centers is 31 ft. and the side door clear openings are 6 ft. wide by 8 ft.  $6\frac{1}{16}$  in.

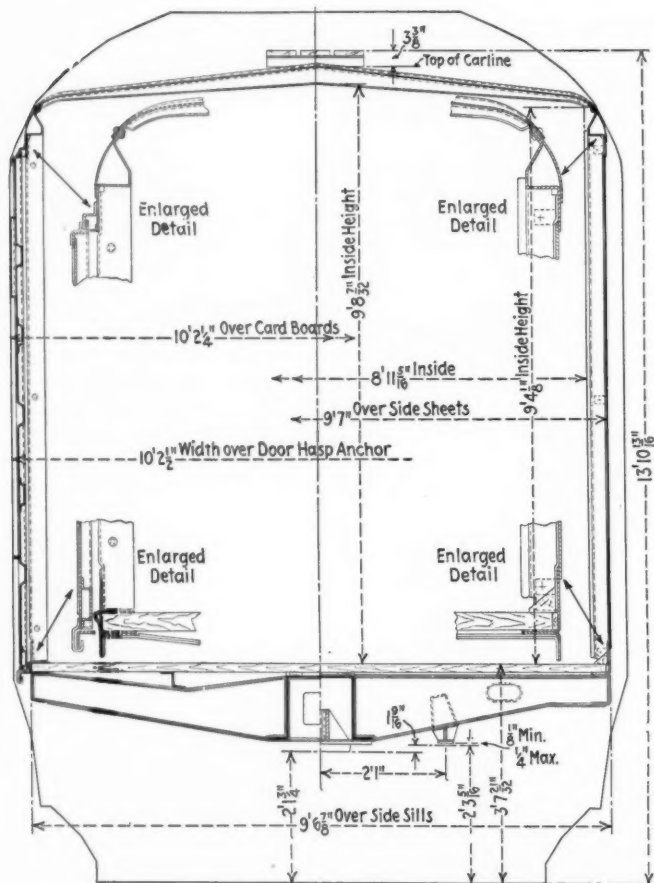
\* Exhibited on the Illinois Central tracks near the 12th Street station, Chicago, during the annual meeting of the A.A.R., Mechanical Division, June 26 and 27, 1935.

top flange to be reduced slightly in thickness, thus reducing the weight to 29.2 lb. per ft. The two sills are joined by welding continuously throughout their length at the junction of the two top flanges. The cross-sectional area is 17.2 sq. in. total. Six center-sill separators, made of  $\frac{1}{8}$ -in. pressed plate, are located, one at each floor beam and crossbearer. The draft sills are formed by the continuation of the center sills, the bolster center fillers, rear draft lugs, front draft lugs and striker being built up integral with the center sills by the arc-welding of rolled plates and bars. The end



sills are 6-in. by 3½-in. pressed angles, offset at the center of the car downward to the top of the center sill.

Each body bolster consists of four 5½-in. pans with 21-in. by 5/16-in. top and bottom cover plates extending continuous from side sill to side sill. The bolster is connected to the side sill by a pressed channel. The



Cross-Section Showing Inside Width 2 5/16 In. Greater Than Standard

web of the diaphragm over the side bearings is reinforced with a pressed plate welded between the pan webs and the bolster bottom cover plate. The body center plates consist of drop-forged bowls, conforming to the A.A.R. contour, arc-welded to separate 5/8-in. plates. The body side bearings, arc-welded assemblies of rolled bars, are provided with 3-in. by 1/4-in. spring steel wear plates.

Each of the four crossbearers per car consists of two 1/8-in. pans having top and bottom cover plates, extending from side sill to center sill, in the case of the former, and from side to side under the center sill, in the case of the latter. The webs of crossbearer diaphragms are stiffened at two points with pressed vertical angles spot-welded in place. The cover plates are secured to the diaphragm and the diaphragm to the center sill and side sill with rivets.

#### Floor Supports and Floor Construction

The floor beams, of which there are two per car, each consists of two 1/8-in. pans extending from center to side sill and connected to the side sill by thick channel-shaped gussets. Diaphragms are riveted direct to the center sill and side sill. Four diagonal braces per car are pressed from a 10-in. by 1/8-in. plate applied one in each corner of the underframe and extending from the

corner of the car to the bolster and the center-sill intersection. These braces are riveted to the end and side sill at the corner and to the bolster at the intersection, being welded to the center sill.

The floor stringers, two per car, extending lengthwise between the bolsters, are made of 3/32-in. plate pressed into a 3-in. Z-bar, spliced at and welded to the first cross-bearer toward the end of the car. The floor beams and crossbearers are depressed in order to support the floor stringers and permit them to extend continuously from

#### Comparative Box Car Dimensions and Weights

	Pullman-Standard Cor-Ten Steel Box Car	Chicago Great Western A.A.R. Standard Box Car	Former Conventional Steel-Sheathed Box Car
Inside length .....	40 ft. 6 1/16 in.	40 ft. 6 in.	40 ft. 6 in.
Inside width .....	8 ft. 11 5/16 in.	8 ft. 9 in.	8 ft. 9 1/4 in.
Inside height .....	9 ft. 4 7/8 in.	9 ft. 4 in.	8 ft. 7 3/8 in.
Cubic capacity .....	3,384 cu. ft.	3,311 cu. ft.	3,056 cu. ft.
Load limit .....	134,800 lb.	124,600 lb.	123,000 lb.
Body weight .....	20,240 lb.	28,560 lb.	.....
Truck weight .....	13,960 lb.	15,840 lb.	.....
Total light weight .....	34,200 lb.	44,400 lb.	46,000 lb.
Maximum rail load .....	169,000 lb.	169,000 lb.	169,000 lb.
Ratio A.A.R. load limit to maximum rail load..	79.8 per cent	73.7 per cent	72.8 per cent

bolster to bolster without the use of intermediate brackets. At the bolster, the floor stringers are attached to the bolster top plate by 3/16-in. pressed Z-shape gussets.

The car floor is made of 1¾-in. by 5/16-in., tongue-and-groove, long-leaf yellow pine, bolted directly to the side sills and floor stringers with 1/2-in. Water-Tight bolts.

Edgewater ring-spring type B-32-KA draft gears are applied, using a 2¼-in. follower at each end of the gear



View Showing Underframe Construction; Also Superstructure Framing and Sheathing

to accommodate the 24 5/8-in. draft-gear pocket. The draft gear carriers, two per car, are made of 8-in. by 5/8-in. open-hearth steel secured to each center-sill flange with button-head rivets.

Type-E couplers, furnished by the National Malleable & Steel Castings Co., have 6¼-in. by 8-in. shanks and are made of high-tensile cast steel to provide light weight. The high-tensile cast-steel coupler yokes are of the vertical type and light-weight design. The coupler

keys, 6-in. by 1½-in. in section, with half-round edges, are held in place with A.A.R. standard T-head pins. The coupler release rigging is of the Pullman-Standard rotary bottom-operating type

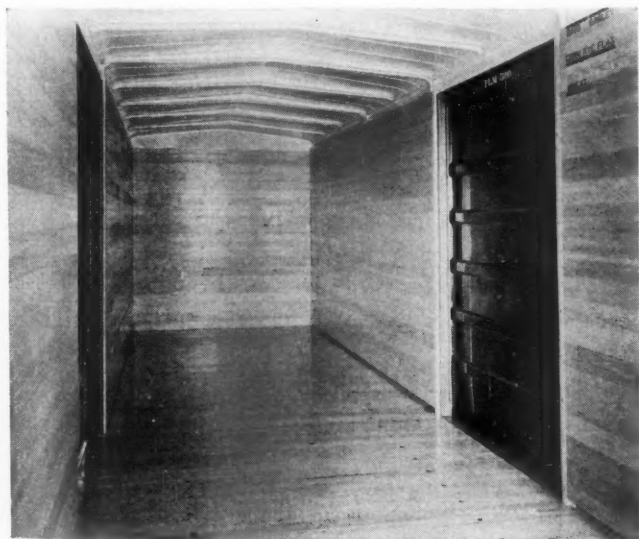
### The Side and End Construction

The side plates, two per car, are built up of ⅛-in. and ⅜-in. plates, pressed to form a rounding corner for the eaves of the roof. Each side sill is a 6-in. by 3½-in. pressed angle extending the full length of the car. The side sill reinforcements, of which there are two per car, are placed at the doorways and are made of ⅜-in. plate pressed channel sections 16 ft. 4 in. long.

The side posts, 16 per car, are 3-in. deep Z-bars, pressed from ⅛-in. plate, spot and arc-welded to the side sills and the side plates. The door posts, four per car, are made of ⅜-in. pressed channels, 3 in. deep. Door post fillers, to which lining and grain door strips are nailed, are made of fir. Each corner post is built up of two ⅛-in. plates forming a box section. The outer portion of the post is a pressed angle, the inner part being pressed diagonally to the two outer toes of the outside angle, and the side and end sheets being sandwiched between the two parts of the post.

The end posts, six per car, made of ⅛-in. pressed channels, are flanged to bear against and spot-welded to the end sheets. Each end post is also arc-welded to the end sill and end plate. The end post is reinforced at the bottom by ⅛-in. pressed channels spot-welded to the post for a distance of approximately 3 ft. from the bottom of the post.

The side sheets, of which there are 20 per car, are .05-in. sheets, each pressed with two ½-in. deep corrugations extending vertically from side plate to sill. The



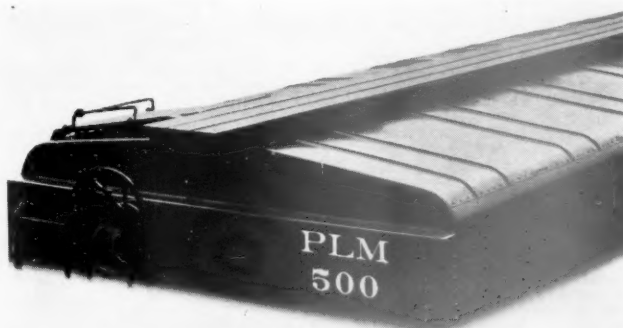
Interior of Finished Car Ready for Service

side sheets are spot-welded to the side plate, posts and sill. The side and end sheets are secured to the corner post construction with ⅜-in. button-head rivets. The side and end lining nailers at the corner posts are fir, each bolted with clips which are in turn riveted to the corner post. The side lining, 2½-in. by 5⅝-in. tongue-and-groove fir, extends from 1½ in. above the floor to the side plate and is nailed to the vertical furrings bolted to three clips welded to the side plate, side sill and side sheet.

The door sheets are .05 in. thick. There are three sheets per door. The bottom and middle sheets are corrugated along the top edge, with the bottom of the

middle and top sheets extending over this corrugation and forming a box section. Each sheet also has an intermediate corrugation, providing in all three open corrugations per door and two intermediate boxed sections. The door, complete with top and bottom rails and rollers, weighs 180 lb., which may be compared with 352 lb. for the C. G. W. car door, made of .10-in. open-hearth steel.

The top end sheets are of ⅜-in. plate pressed at the top to form an integral end plate and sheared along the top edge to follow the contour of the roof. The



Partial View Showing the Roof Construction

bottom edge of the top sheet offsets and laps the bottom sheet ¾ in., being spot-welded to it and thus forming a horizontal seam across the end of the car. The bottom end sheets are of ⅛-in. plate, extending from side to side of the car and spot-welded to the vertical leg of the end sill.

The end lining is of 2½-in. by 5⅝-in. tongue-and-groove fir, extending horizontally from side to side of the car from the top of the floor to the bottom of the end plate. The lining is nailed to the corner post fillers and to two vertical intermediate furrings which are bolted to ⅛-in. pressed clips riveted to the end sheets.

### Details of the Roof Construction

The carlines, 11 per car, are ⅜-in. pressed channel sections, extending from side to side and secured to the side plates with button-head rivets. The door-post carline and the third carline from the end are further connected to the side plate with ⅜-in. pressed reinforcements arc-welded in place.

The intermediate roof sheets, 10 per car, are .05 in. thick, spot-welded to the carlines and secured to the side plate with ⅜-in. button-head rivets. The roof sheet at each end of the car is spot-welded to the carline and secured to the side plate and to the end plate with button-head rivets. Each roof sheet has two corrugations, ½ in. deep over-all, extending from side to side of the car.

Westinghouse Type-AB air brake equipment is installed, being the regular 10-in. by 12-in. schedule with the exception that the reservoir is pressed steel. The train line is 1¼-in. standard-weight butt-welded black steel pipe with extra-heavy end nipples. The pipe connecting the AB valve and the reservoir is ¾-in. standard black steel pipe. The retainer pipe also is black steel pipe. The car is braked to 75 per cent of its light weight, based on 50 lb. per sq. in. cylinder pressure. The Equipco hand brakes are of the vertical-wheel geared-type with aluminum housing. The brake badge plate is of aluminum, applied to the center sill near the cylinder. The brake rods, pins and levers are of conventional design, cylinder supports, reservoir supports,



AB valve supports, brake rod guides being of light-weight design.

### Safety Appliances—Trucks

The ladder treads and grab irons are of  $2\frac{1}{32}$ -in. round open-hearth steel. The grab irons are secured to  $\frac{1}{8}$ -in. pressed brackets with  $\frac{1}{2}$ -in. rivets, which in turn are securely riveted to the side and end sheets with  $\frac{3}{8}$ -in.

### Partial List of Specialties on Pullman-Standard Light-Weight Box Car

Cor-Ten steel sheets and shapes. Illinois Steel Company, Chicago  
Air brakes, AB 10 by 12.....Westinghouse Air Brake Company, Wilmerding, Pa.  
Draft gears, B-32-KA ring spring.....Edgewater Steel Company, Pittsburgh, Pa.  
Hand brakes, light weight.....Equipment Specialties Company, Chicago  
Alloy-steel couplers and yokes.....National Mall. & Steel Castings Co., Cleveland, Ohio  
Body brake levers, drop-forged.....Schaefer Equipment Company, Pittsburgh, Pa.  
Doors and fixtures, journal wedges, chilled-tread wheels.....Pullman-Standard Car Mfg. Co., Chicago  
Water-Tight bolts.....MacLean-Fogg Lock Nut Company, Chicago  
Axles, A.A.R. standard.....Standard Forgings Company, Chicago  
Alloy-steel truck castings.....American Steel Foundries, Chicago  
Brake beams and supports.....Chicago Railway Equipment Company, Chicago  
Brakes shoes.....American Brake Shoe & Fdry. Co., New York  
Journal bearings.....The Orme Company, Chicago  
Journal-box lids and truck springs.....American Locomotive Company (Railway Steel-Spring Division), New York  
Bottom rod guards, Universal-type.....Chicago Railway Equipment Company, Chicago  
Brake-beam hangers, truck levers, hanger wear plates and bottom connections.....Schaefer Equipment Company, Pittsburgh, Pa.

rivets suitably backed up with reinforcing plates to form a firm anchorage. Ladder treads are straight plain rungs extending into the pressed channel ladder stile and welded in place inside the inner flange of the channel. The ladder stiles are formed of  $\frac{3}{32}$ -in. steel channel section flared out at the top and bottom and formed to provide integral attachment to the car without the use of separate brackets. The sill steps are of a pressed channel section,  $\frac{3}{16}$ -in. material, flattened at the end and bent over to form feet for riveting direct to the under side of the side sill. The sill steps are secured with  $\frac{5}{8}$ -in. rivets.

The longitudinal running board is three boards wide, extending the full length of the car with spliced joints staggered and secured to the pressed angle running board saddles with  $\frac{3}{8}$ -in. Water-Tight bolts. The latitudinal running board consists of seven boards,  $5\frac{3}{4}$ -in. by  $1\frac{1}{8}$ -in. long-leaf yellow pine, secured to pressed brackets with  $\frac{3}{8}$ -in. Water-Tight bolts. The latitudinal running board bracket is a pressed Z-shape with the end at the side plate flared out and riveted to the roof sheet, which is reinforced on the inside by a gusset which rivets to the side plate and the roof sheet joint.

### The Trucks

The car trucks are of the double-truss, spring-plankless type. Especially-shaped surfaces in the bolster and column connection provide proper engaging areas and self-alinement without the use of the spring plank. The truck side frames and bolsters, furnished by the American Steel Foundries, are of light-weight design and made of manganese-vanadium steel, double-normalized, conforming to proposed A.A.R. requirements for light-weight trucks. Creco all-steel brake beams, furnished by the Chicago Railway Equipment Company, are also of special light design, but conform in interchange and capacity to requirements for A.A.R. No. 15 brake beams. The Creco fourth-point supports are attached to the side frames. Coil elliptic springs are used. Pull-

man-Standard chilled-tread car wheels are a light design, weighing only 665 lb. per wheel. A.A.R. standard carbon steel axles are applied with  $5\frac{1}{2}$ -in. by 10-in. journals.

## Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended June 8 totaled 630,494 cars, an increase of 65,494 cars as compared with the preceding week, which included a holiday, and an increase of 14,068 cars as compared with the corresponding week of last year. This was also an increase of 61,679 cars as compared with 1933. Much of the increase was due to heavy loading of coal in anticipation of a strike of miners. Loading of forest products and ore also showed increases as compared with last year, but live stock and coke showed decreases as compared with the week before. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

### Revenue Freight Car Loading

For Week Ending Saturday, June 8

Districts	1935	1934	1933
Eastern .....	145,853	138,911	131,297
Allegheny .....	128,835	128,135	108,697
Poconantas .....	48,387	41,190	39,352
Southern .....	90,636	82,814	85,689
Northwestern .....	87,491	90,574	72,963
Central Western .....	83,352	87,569	81,443
Southwestern .....	46,282	47,575	49,716
Total Western Districts.....	217,125	225,718	204,122
Total All Roads .....	630,836	616,768	569,157
Commodities			
Grain and Grain Products.....	24,515	30,828	36,007
Live Stock .....	10,911	15,129	15,824
Coal .....	141,041	101,916	89,256
Coke .....	5,863	6,924	4,482
Forest Products .....	25,818	24,601	24,625
Ore .....	32,377	32,000	10,665
Merchandise L.C.L. ....	157,633	162,985	168,385
Miscellaneous .....	232,678	242,385	219,913
June 8 .....	630,836	616,768	569,157
June 1 .....	565,342	579,656	512,974
May 25 .....	599,543	625,990	545,551
May 18 .....	583,327	612,331	535,719
May 11 .....	575,185	602,798	534,806
Cumulative Total, 23 Weeks.....	13,337,082	13,548,417	11,500,184

### Car Loading in Canada

Car loadings in Canada for the week ended June 8 totaled 43,832, as against 42,933 in 1934 and 43,834 for the previous week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
June 8, 1935.....	43,832	21,212
June 1, 1935.....	43,834	19,887
May 25, 1935.....	41,065	21,238
June 9, 1934.....	42,933	22,810
Cumulative Totals for Canada:		
June 8, 1935.....	979,243	516,734
June 9, 1934.....	959,251	538,943
June 10, 1933.....	784,993	400,099

DURING THE 1931-34 DEPRESSION PERIOD the Norfolk & Western's industrial and agricultural department has aided in the establishment of 645 new industries along N. & W. lines. The industries thus established represent an investment of more than \$58,000,000 and employ approximately 33,000 persons.



# Mechanical Division Full-Membership Meeting at Chicago

This is the first annual meeting since 1932—Since that time committee reports have been acted upon by the General Committee in open meetings

**A**FTER a lapse of three years the Mechanical Division of the Association of American Railroads resumes the holding of its full-membership annual meetings this year. The fourteenth annual meeting of this organization which, during the past year, has become a division of the Operations and Maintenance Department of the recently organized Association of American Railroads, will convene at the Congress Hotel, Chicago, on Wednesday morning, June 26.

The program has been confined strictly to the business of the presentation and discussion of the reports of the standing committees. No provision has been made for addresses by distinguished visitors which have long been a feature of the programs of this organization. By thus confining the program to the business of the division it is intended that it be kept within three sessions—a morning and afternoon session on Wednesday and a morning session on Thursday.

Reports will be presented by all of the standing committees except those on Automotive Rolling Stock and Research. No report is scheduled for the special Joint

Committee on the Utilization of Locomotives and Conservation of Fuel. After a lapse of three years a report will be presented by the Nominating Committee and new officers will be elected.

## New Cars on Inspection

No exhibit has been held in connection with a meeting of the Mechanical Division since 1930. This year, although no thought of a formal exhibit has been entertained in connection with the preparations for the meeting, something in the nature of an exhibit has developed spontaneously since the announcement of the return to full-meeting status. Four freight cars, in the construction of which the recently developed alloy steels and special features of design have been employed, will be in Chicago during the days of the meeting and will be available for inspection of the members of the division interested in them. These include two box cars and two hopper cars, all independently designed, references to which will be found elsewhere in this issue.

The calendar of the meeting follows.

## Program of the Fourteenth Annual Meeting of the Mechanical Division

*Wednesday, June 26, 10 A. M., Daylight Saving Time*

Meeting called to order by the chairman of the division, E. B. Hall.

Opening remarks of chairman.

Action on minutes of 1932 annual meeting.

Appointment of Committees on Subjects and Resolutions.

Unfinished business.

New business.

Report of the General Committee.

Report of the Committee on Safety Appliances, including report of Investigation of Train Line Connectors. R. G. Henley, chairman of the committee, will present the report, and Harley A. Johnson, director of research in charge of the Automatic Train Line Connector Investigation, will present the portion of the report covering that investigation.

Report of Committee on Locomotive and Car Lighting, to be presented by W. E. Dunham, chairman of the committee.

Report of Committee on Electric Rolling Stock, to be presented by R. G. Henley, chairman of the committee.

Report of Committee on Specifications for Materials, to be presented by F. M. Waring, chairman of the committee.

Report of Committee on Lubrication of Cars and Locomotives, to be presented by Geo. W. Ditmore, chairman of the committee.

Report of Committee on Wheels, to be presented by H. W. Coddington, chairman of the committee.

Adjourn for lunch, 12:30 p. m.

Meeting called to order by the chairman at 2 p. m.

Report of Committee on Car Construction, to be presented by

P. W. Kiefer, chairman of the committee, and by the chairmen of the various sub-committees. Following the presentation of the regular printed report of the committee, Mr. Kiefer will present a supplementary report covering alternate designs of 50-ton and 70-ton hopper cars.

Report of Committee on Tank Cars, to be presented by G. S. Goodwin, chairman of the committee.

Report of Committee on Loading Rules, to be presented by S. Lynn, chairman of the committee.

*Thursday, June 27, 9:00 A. M., Daylight Saving Time*

Meeting called to order by the chairman.

Report of Committee on Locomotive Construction, to be presented by W. I. Cantley, chairman of the committee, and chairmen of various sub-committees.

Report of Arbitration Committee, to be presented by W. H. Flynn, chairman of the committee.

Report of Committee on Prices for Labor and Materials, to be presented by A. E. Calkins, chairman of the committee.

Report of Committee on Brakes and Brake Equipment, to be presented by G. H. Wood, chairman of the committee.

Report of Committee on Couplers and Draft Gears, to be presented by R. L. Kleine, chairman of the committee, and chairmen of various sub-committees.

Report of Committee on Nominations, to be presented by J. J. Hennessey, chairman of the committee.

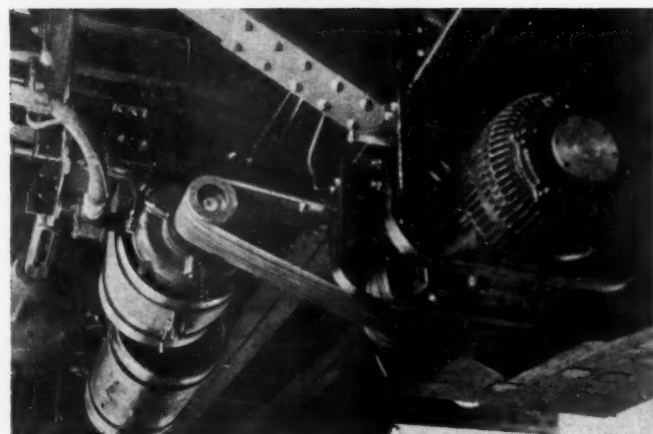
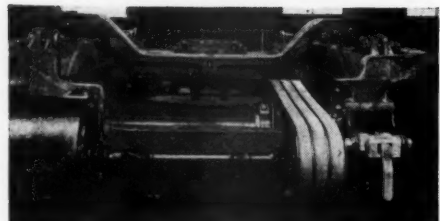
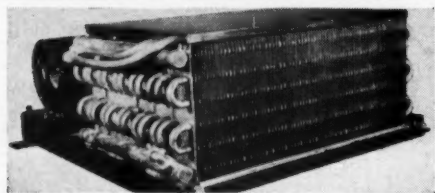
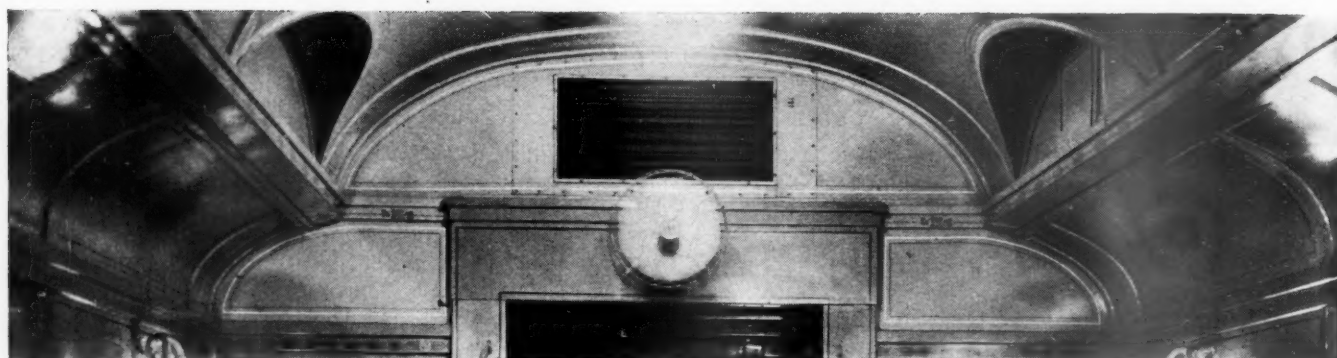
Surrender chair and gavel to new chairman and call new vice-chairman to the platform.

Presentation of past chairman's badge.

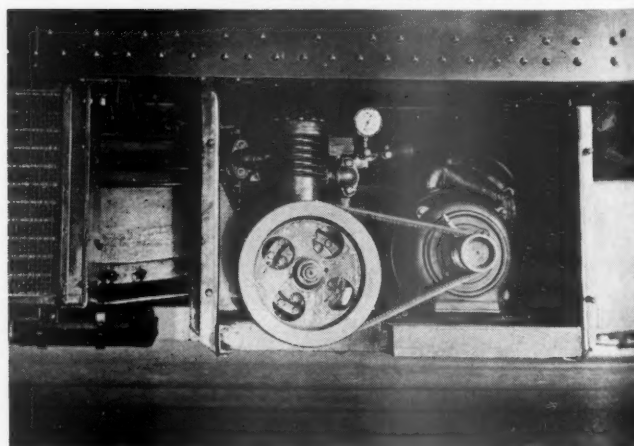
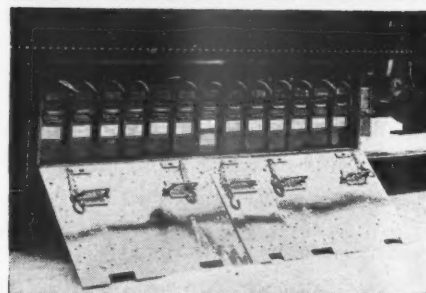
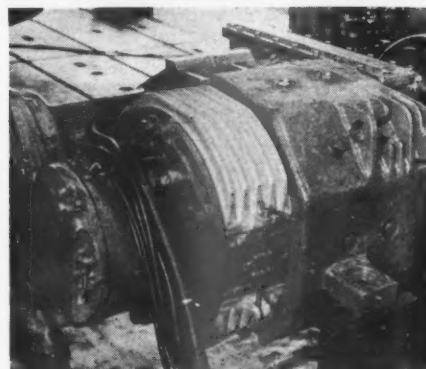
Report of Committee on Resolutions.

# Courage and Initiative Have Not

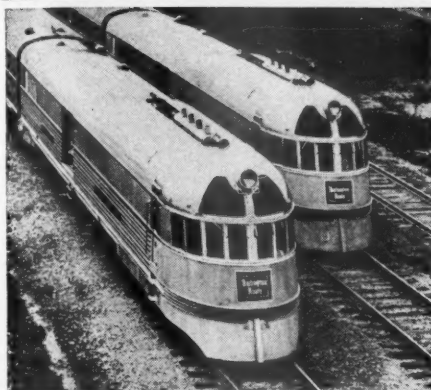
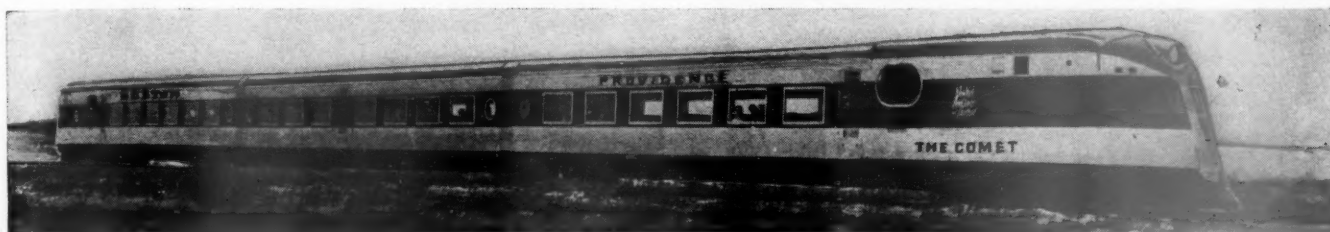
A revolution in railway rolling stock and motive power has gone into full swing since 1932 when the Mechanical Division held its last meeting



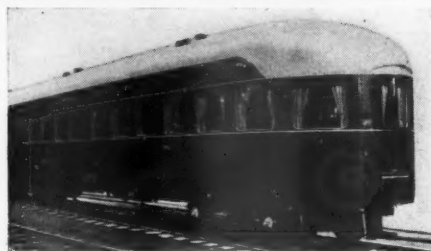
Air conditioning, a development of the depression period, has changed the whole future of railway passenger transportation. Since 1932 the number of air-conditioned passenger cars has increased by more than 5,000. The railways have spent between thirty and fifty million dollars on this account.



# Been Killed by the Depression



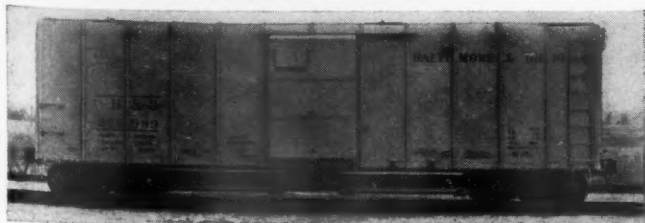
New materials of construction—stainless steel, aluminum alloys, strong corrosion-resistant alloy steels—have been wrought into passenger cars and trains of new forms. Weights have been reduced and higher speeds made practicable without pyramiding power requirements.



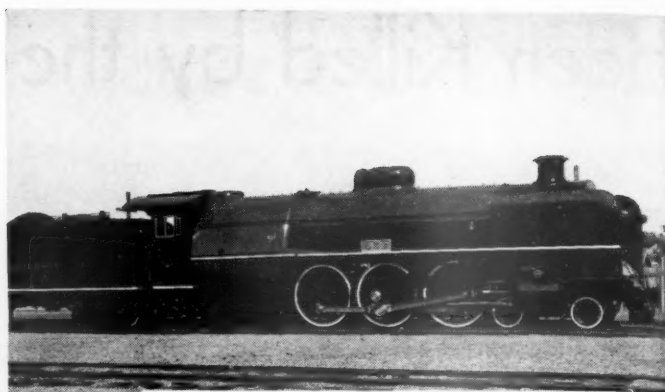
Welding as a structural process, associated with both the new and the old materials, is contributing to the revolution.



New materials and welding have given new scope to the designer's art in freight-car construction as well as in passenger cars. Weights are being reduced. Recent steps in this field are set forth elsewhere in this issue.

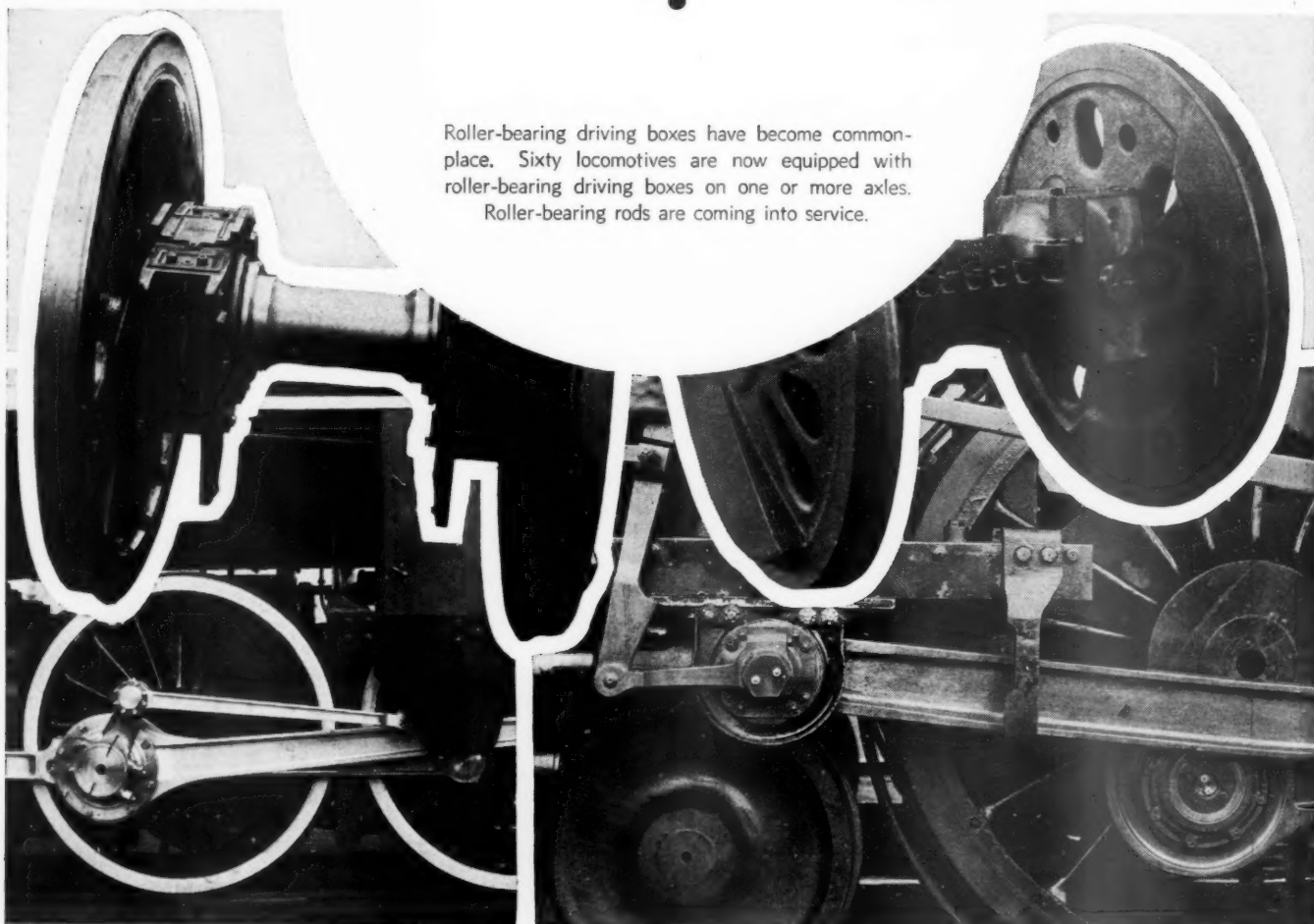


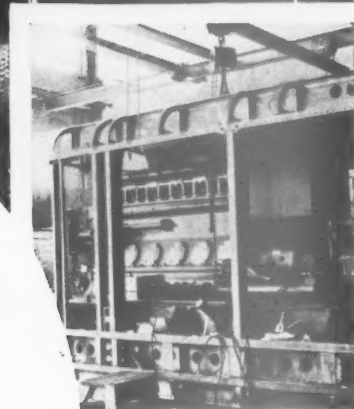
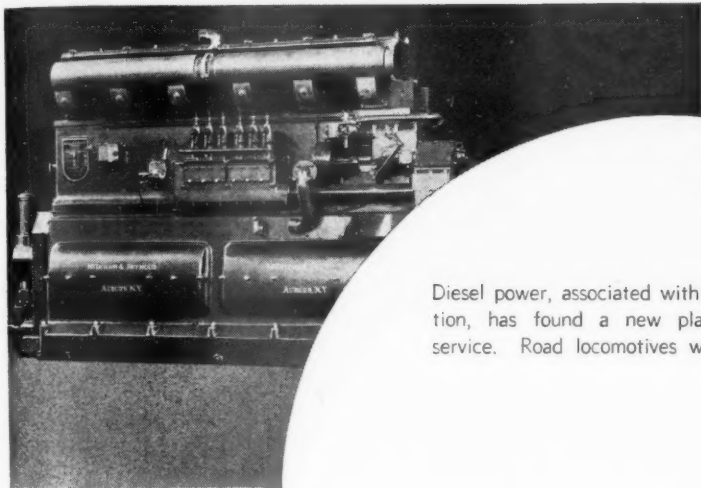
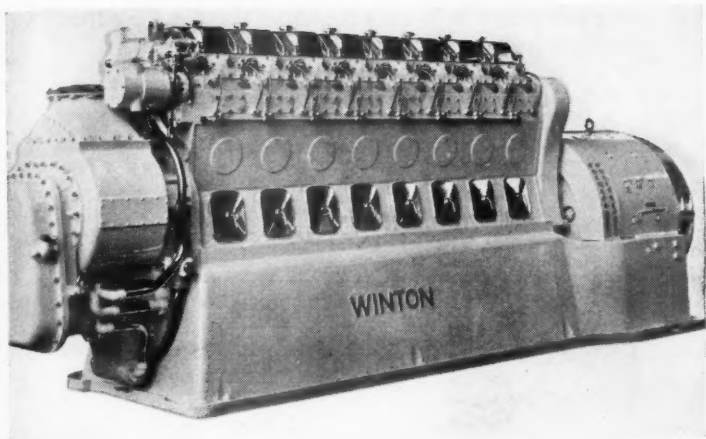




The steam locomotive grows more vital. Modifications in proportioning adapt it to the highest speed service. Poppet valves are in use. Streamlining is on trial.

Roller-bearing driving boxes have become commonplace. Sixty locomotives are now equipped with roller-bearing driving boxes on one or more axles. Roller-bearing rods are coming into service.

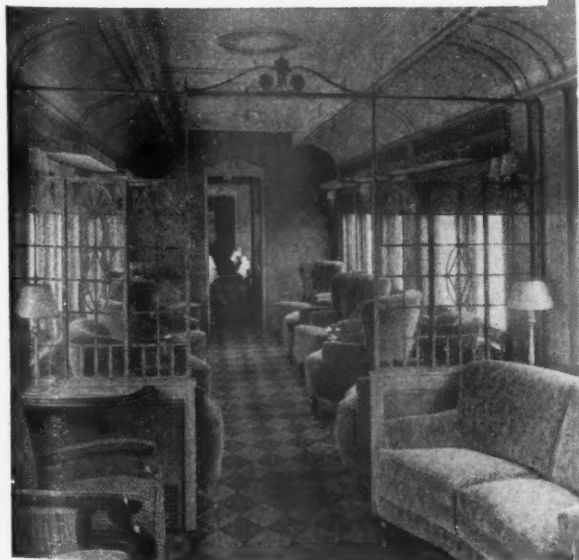




Diesel power, associated with light-weight construction, has found a new place in passenger-train service. Road locomotives will soon enter service.



Standardization of interior appointments and decorations is being superseded by esthetic standards.



## Railroad Week Climaxed on June 15

**P**ARADES, picnics and band concerts held in cities throughout the West on June 15 were the grand finales of Railroad Week. At Chicago more than 15,000 railroad employees and a number of American Legion drum and bugle corps paraded through the loop

ating telegraph keys and the cities from which they sent messages were as follows:

R. J. Safer, train dispatcher, Wabash.....	Decatur, Ill.
D. J. Deasey, asst. vice-pres., Alton.....	Springfield, Ill.
F. W. Green, vice-pres., St. Louis Southwestern.....	St. Louis, Mo.
E. R. Glidden, supt., Chicago & Eastern Illinois.....	Evansville, Ind.
J. C. Marley, telegrapher, Illinois Central.....	Memphis, Tenn.
A. W. Tousley, asst. to oper. off., Chicago, Rock Island & Pacific.....	Des Moines, Iowa
H. C. Chace, supt., telegraph, Atchison, Topeka & Santa Fe.....	Kansas City, Mo.
W. M. Jeffers, exec. vice-pres., Union Pacific.....	Omaha, Neb.
J. E. Hutchinson, special representative to president, St. Louis-San Francisco.....	Tulsa, Okla.



Train Orders, Messages and Signaling Devices Were Displayed Near the Key Operated by W. F. Thiehoff in the Union Station, Chicago, While Conducting the "Dot and Dash Pow Wow"

district, requiring more than one hour to pass the reviewing stand at the city hall. Cash prizes were awarded to the best American Legion drum and bugle corps and to the best junior drum and bugle corps.

### Programs Designed to Create Good-Will

As reported in the *Railway Age* of June 15, elaborate programs designed to create good-will and including many dramatic features, were staged in cities throughout the West during the week. Thirty-one officers of western railroads, who, during their careers, had operated telegraph keys, participated in the telegraph "pow-wow" conducted by the western lines over a 7,000-mile Western Union circuit embracing as many cities in the West on June 10. The "pow-wow," during which the various officers exchanged appropriate felicitations, was directed from the Union station, Chicago, W. F. Thiehoff, general manager of the Chicago, Burlington & Quincy, acting as master of ceremonies and calling upon the various cities for their greetings. R. B. White, president of the Western Union, enroute to New York, detrained at Elkhart, Ind., and from that point opened the 7,000-mile circuit with the telegraph key used by Marconi to open the Century of Progress. Others oper-

C. G. Lunday, vice-pres., Louisiana & Arkansas.....	Shreveport, La.
W. J. Allen, supt. telegraph, St. Louis Southwestern.....	Texarkana, Tex.
C. D. Lusk, ticket agent, Missouri-Kansas-Texas.....	Dallas, Tex.
J. A. Nelson, pensioned telegrapher, Missouri Pacific.....	Houston, Tex.
R. V. Dover, traffic mgr., Chamber of Commerce.....	San Antonio, Tex.
J. W. Brunton, supt. telegraph, Denver & Rio Grande.....	Denver, Colo.
H. L. Crawford, telegrapher, Southern Pacific.....	Salt Lake City, Utah
J. R. Martin, pres., J. R. Martin Company.....	Los Angeles, Cal.
C. M. Scott, local treasurer, Southern Pacific.....	San Francisco, Cal.
B. F. Irvine, editor, Oregon Journal.....	Portland, Ore.
H. B. Earling, vice-pres., Chicago, Milwaukee, St. Paul & Pacific.....	Seattle, Wash.
T. F. Lowry, asst. gen. mgr., Northern Pacific.....	Spokane, Wash.
A. W. McKay, supt. telegraph, Great Northern.....	Great Falls, Mont.
A. C. Kohlase, traffic mgr., Chicago, Milwaukee, St. Paul & Pacific.....	Butte, Mont.
E. E. Dildine, supt. telegraph, Northern Pacific.....	Billings, Mont.
J. C. Rankine, asst. to oper. vice-pres., Great Northern.....	Fargo, N. D.
G. A. Sherwood, asst. gen. frt. agent, Minneapolis, St. Paul & Sault Ste. Marie.....	Duluth, Minn.
W. H. Corbett, vice-pres. & gen. mgr., Minneapolis, St. Paul & Sault Ste. Marie.....	Minneapolis, Minn.
A. M. Fenton, vice-pres., chg. traffic, Chicago & North Western.....	St. Paul, Minn.
E. A. Patterson, supt. telegraph, Chicago, Milwaukee, St. Paul & Pacific.....	Milwaukee, Wis.

A hand car race, in which picked crews from several railroads participated, was run over street car tracks on Franklin street in Chicago on June 12. The derby was won by the Chicago, Burlington & Quincy team. A train-calling contest held at Madison and State streets on the same day was won by Jack Barrowcliffe of the Chicago, Rock Island & Pacific.

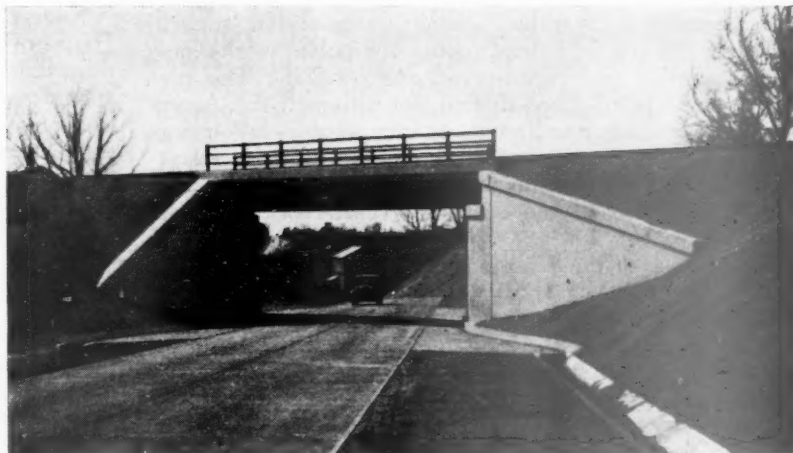
The Start of the Hand-Car Derby in Which Picked Crews from Several Railroads Participated





# \$200,000,000 for Grade Separation

Fund allotted by federal government, which may be used also for protection, will advance program for reducing hazard at railway-highway crossings, with benefit to all



**A**LTHOUGH grade separation has long had an important role in the construction activities of the railroads, it now occupies the center of the stage. With the decline in other classes of improvements during the last few years and the concurrent increase in the pressure for the elimination of grade crossings of tracks with highways, separation projects have gradually absorbed an increasing part of the time and attention of engineering staffs. This tendency has been accelerated during the last two years by the action of Congress in making federal funds available for such projects, and now that \$200,000,000 of the \$4,000,000,000 unemployment relief fund has been allotted specifically for improvements designed to decrease grade crossing hazards, grade crossing elimination and protection assume greater importance than at any time in the past.

At the round figure of \$75,000 per crossing, this sum, if used exclusively for grade separation, would provide for the elimination of nearly 3,000 crossings, which compares with some 620 projects of various character undertaken under the current public works program, a large percentage of which were completed in 1934, and a total of 2,159 separations effected in the eight years from 1926 to 1933, inclusive. This \$200,000,000 is the initial allotment for this purpose from a total of \$800,000,000 which has been made available, under the terms of the federal work relief appropriation, for "highways, roads, streets and grade crossing elimination." Additional allotments may be made later.

## Program Initiated in 1933

In making specific provision for the use of federal funds for grade separation, Congress followed the precedent it had established under the terms of Sec. 204, Title II of the National Industrial Recovery act of 1933, in which it provided a fund of \$400,000,000 for the emergency construction of highways, specifying that "The amount apportioned to any state may be used to pay all or any part of the cost of \* \* \* highway and bridge construction, including the elimination of hazards to highway traffic *such as the separation of grades at crossings* \* \*." Similar provisions were incorporated in the supplemental appropriation of \$200,000,000 in 1934, and marked progress has been made in grade separation work under the terms of these two appropriations.

Credit for the initiation of this movement to stimu-

late grade separation and promote safety at grade crossings by the appropriation of federal funds to these ends is due Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, who directed the attention of the administration to the merits of grade crossing elimination and protection when legislation for an expanded program of public works was under consideration in 1933. Furthermore, the success that attended the conduct of these improvements during the last two years under his direction was primarily responsible for the incorporation of such projects in the work relief appropriation of 1935.

In the earlier efforts of Congress to encourage work of this particular class as a means of stimulating employment, it was left to the discretion of the administrative officers of the individual states whether they would include grade separation in the work to be done with the federal funds allotted. Therefore, although the total of the funds allotted by the states to grade separation as of May 31, 1935, amounted to \$30,597,927, apportioned among 620 projects, there was a wide disparity in the proportions of the individual state allotments that were set aside for this purpose. Up to January 31, 1935, four states had spent no part of their allotment for this purpose, whereas Illinois allocated 25 per cent of its share, or \$4,411,090, for work on 78 projects. The average for all the states was only 6.35 per cent.

## Definite Allotments to the States

No such latitude is allowed the states under the terms of the new work relief appropriation, for although Congress has given the President some discretion in determining how much money shall be spent for grade separation, it has specified definitely how this amount shall be apportioned among the states, the formula for the division differing from that specified for the allotment of public roads funds in that railroad mileage within the states is one of the controlling factors.

The primary objective of the \$4,000,000,000 work relief fund is to give employment to those employables still on relief rolls—any other objectives are purely secondary. In view of this, priority among the many classes of work that may be carried out under the terms of the resolution under which the appropriation has been authorized will be determined largely by their relative effectiveness as instrumentalities for this primary objective. And since grade separation has been shown to provide direct employment in larger measure than

highway construction, for example, it assumes a greater importance in the program to that extent.

But this does not mean that due weight has not been given to the contingent benefits to result from this vast expenditure of public funds, and here, also, grade separation occupies a favorable position, because few suggestions for the use of federal money for public works have been accorded such widespread approbation. The reason for this is not hard to find, for although the American people have manifested an inexplicable callousness with respect to the record of deaths and injuries resulting from highway accidents as a whole, they have been keenly sensitive to the casualty records of the grade crossings.

Regardless of the reason for this contrast in attitude, the record demonstrates that the opportunity for "doing something about it" is more favorable with respect to the accidents at grade crossings than with those involving road and street traffic as a whole. Deaths and injuries at grade crossings have shown a pronounced decrease since 1929. No such improvement has taken place in the highway accident record as a whole.

### The Record to Date

In the absence of any appreciable improvement in the driving habits of highway users, as evidenced by the steadily increasing number of highway accidents, the decrease in accidents at crossings of railway tracks must be ascribed to physical improvements, namely, better protection of grade crossings and the elimination of crossings by abandonment, highway relocation and grade separation. However, in so far as the latter is concerned, superficial consideration would indicate that little progress has been made up to the present time.

This is demonstrated by the record of the changes in the total number of railway-highway grade crossings for the years 1926 to 1933, inclusive. At the close of 1933, there were 235,827 crossings, or 669 more than at the end of 1926. In other words, the number of new crossings established exceeded the number eliminated during the seven years. However, this presentation does not give an entirely true picture, because the crossings selected for elimination are, in the vast majority of cases, those subjected to heavy highway and railway traffic, while the new crossings in most cases carry a limited volume of traffic.

This point has an important bearing on the ultimate solution of the grade crossing problem as affected by the present program for the elimination of a large number of crossings through the agency of the present federal appropriation, and such subsequent appropriations as may be made. With some 235,000 grade crossings of highways and railways in the United States at the present time, the separation of 3,000 of these under the present program means a reduction of only 1.25 per cent in the total, a seemingly insignificant proportion. But inasmuch as the crossings that are being selected for separation include those presenting the greatest hazard and the vast majority of the 235,000 crossings are subjected to relatively little use, the decrease in hazard to be effected will be immeasurably greater than may be indicated by any statistical study of the change in the total number of crossings.

While by far the larger part of the existing crossings must remain at grade indefinitely, because their elimination would involve an outlay of fantastic proportions and could not be justified on any conceivable basis, the present program of elimination will remove a considerable proportion of the crossings that are the primary source of concern. Measures for the protection of some proportion of the crossings that remain at

grade must always have an important part in the program for reduced hazard at the crossings of railways and highways.

### Terms of the Resolution

Excerpts from the joint resolution of Senate and the House of Representatives covering the Work Relief Appropriation, in so far as they relate to grade separation and protection, are reproduced below:

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to provide relief, work relief and to increase employment by providing for useful projects, there is hereby appropriated out of any money in the Treasury not otherwise appropriated, to be used in the discretion and under the direction of the President, to be immediately available and to remain available until June 30, 1937, the sum of \$4,000,000,000, together with the separate funds established for particular areas by proclamation of the President pursuant to section 15 (f) of the Agricultural Adjustment Act (but any amounts thereof shall be available for use only for the area for which the fund was established); not exceeding \$500,000,000 in the aggregate of any savings or unexpended balances in funds of the Reconstruction Finance Corporation; and not exceeding a total of \$380,000,000 of such unexpended balances as the President may determine are not required for the purposes for which authorized, . . . Provided, That except as to such part of the appropriation made herein as the President may deem necessary for continuing relief . . . or for restoring to the Federal Emergency Administration of Public Works any sums which after December 28, 1934, were . . . impounded or transferred to the Federal Emergency Relief Administration . . . this appropriation shall be available for the following classes of projects, and the amounts to be used for each class shall not, except as hereinafter provided, exceed the respective amounts stated, namely: (a) Highways, roads, streets, and grade-crossing elimination, \$800,000,000; . . . Provided further, that not to exceed 20 per centum of the amount herein appropriated may be used by the President to increase any one or more of the foregoing limitations if he finds it necessary to do so in order to effectuate the purpose of this joint resolution. . . .

Except as hereinafter provided, all sums allocated from the appropriation made herein for the construction of public highways and other related projects (except within or adjacent to national forests, national parks, national parkways, or other Federal reservations) shall be apportioned by the Secretary of Agriculture in the manner provided by section 204 (b) of the National Industrial Recovery Act for expenditure by the State highway departments under the provisions of the Federal Highway Act of November 9, 1921, as amended and supplemented, and subject to the provisions of section 1 of the Act of June 18, 1934 (48 Sta. 993): Provided, that any amounts allocated from the appropriation made herein for the elimination of existing hazards to life at railroad grade crossings, including the separation or protection of grades at crossings, the reconstruction of existing railroad grade crossing structures, and the relocation of highways to eliminate grade crossings, shall be apportioned by the Secretary of Agriculture to the several States (including the Territory of Hawaii and the District of Columbia), one-half on population as shown by the latest decennial census, one-fourth on the mileage of the Federal-aid highway system as determined by the Secretary of Agriculture, and one-fourth on the railroad mileage as determined by the Interstate Commerce Commission, to be expended by the State highway departments under the provisions of the Federal Highway Act of November 9, 1921, as amended and supplemented, and subject to the provisions of section 1 of such act of June 18, 1934 (48 Sta. 993); but no part of the funds apportioned to any State or Territory under this joint resolution for public highways and grade crossings need be matched by the State or Territory . . . Provided, however, That the expenditure of funds from the appropriation made herein for the construction of public highways and other related projects shall be subject to such rules and regulations as the President may prescribe for carrying out this paragraph and preference in the employment of labor shall be given (except in executive, administrative, supervisory, and highly skilled positions) to persons receiving relief, where they are qualified and the President is hereby authorized to predetermine for each State the hours of work and the rates of wages to be paid to skilled, intermediate



and unskilled labor engaged in such construction therein . . .

Sec. 2. The appropriation made herein shall be available for use only in the United States and its Territories and possessions. The provisions of the Act of February 15, 1934 (48 Stat. 351), relating to disability or death compensation and benefits shall apply to those persons receiving from the appropriation made herein, for services rendered as employees of the United States, security payments in accordance with schedules established by the President . . .

The provisions of section 3709 of the Revised Statutes (U. S. C., title 41, sec. 5) shall not apply to any purchase made or service procured in carrying out the provisions of this joint resolution when the aggregate amount involved is less than \$300 . . .

Sec. 7. The President shall require to be paid such rates of pay for all persons engaged upon any project financed in whole or in part, through loans or otherwise, by funds appropriated by this joint resolution, as will in the discretion of the President accomplish the purposes of this joint resolution, and not affect adversely or otherwise tend to decrease the going rates of wages paid for work of a similar nature.

The President may fix different rates of wages for various types of work on any project, which rates need not be uniform throughout the United States: . . .

Sec. 8. Wherever practicable in the carrying out of the provisions of this joint resolution, full advantage shall be taken of the facilities of private enterprise. . . .

Sec. 12. The Federal Emergency Administration of Public Works established under Title II of the National Industrial Recovery Act is hereby continued until June 30, 1937, and is authorized to perform such of its functions under said Act and such functions under this joint resolution as may be authorized by the President. All sums appropriated to carry out the purposes of said Act shall be available until June 30, 1937. . . .

Sec. 13. (a) The acquisition of articles, materials, and supplies for the public use, with funds appropriated by this joint resolution, shall be subject to the provisions of Section 2 of Title III of the Treasury and Post Office Appropriation Act, fiscal year 1934; and all contracts let pursuant to the provisions of this joint resolution shall be subject to the provisions of Section 3 of Title III of such Act. . . .

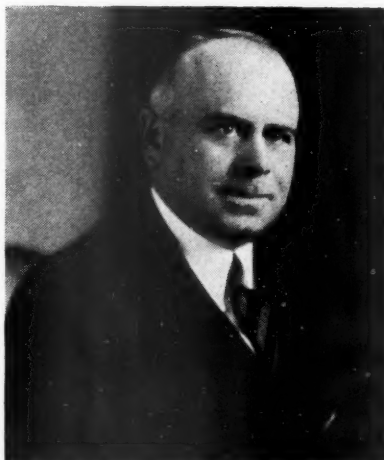
## States and Railways Analyze Situation In Hope To Push Grade Crossing Work

Eagerly the states and the railways await the rules and regulations which are to surround the various phases of grade crossing work authorized to be done with federal funds under the Emergency Relief Appropriation Act of 1935 so that they can swing into full action.

As stated in the first of this group of articles, everybody, including the general public and federal and state administrators, appears in favor of using federal funds for the highly desirable purpose of eliminating or minimizing the hazards at railway-highway grade crossings. The federal administration, however, has definitely placed the accomplishment of this goal, along with the attainment of other desirable goals, secondary to the employment of those on relief rolls.

As pointed out by the President on June 17, the administration feels that it is under mandate from Congress to use the \$4,000,000,000 appropriated under the Emergency Relief Appropriation Act to take 3,500,000 unemployed workers in the country off the relief rolls. To do this, the President has calculated that, in view of the limited amount of money available, the average expenditure per man per year on work projects, including all costs for materials and supplies, cannot exceed \$1,100 to \$1,200. In the specific case of highway and grade crossing work, however, the somewhat more liberal allowance of \$1,400 per man per year was established.

In spite of this concession to highway and grade crossing work, both state highway and railroad authorities fear that the sum allowed is still so limited as to affect seriously the extent to which some of the most desirable types of work can be carried out, at least unless considerable change is made in accepted standards of construction and in the highly efficient means which have been developed to carry it out. That this concern is not without foundation is seen in the fact that it is shared by the U. S. Bureau of Public Roads, which



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Thomas H. MacDonald  
Chief—U. S. Bureau of Public Roads

is now fostering an alternate plan for approval which will relieve highway and grade crossing work (both separation and protection), of the \$1,400 limitation, if the individual states will guarantee to underwrite employment for those on relief rolls to the extent that would otherwise be accomplished through the \$1,400 limitation.

Whatever the outcome may be, the states and the railways are eager to make the most of the situation, and are therefore, awaiting with interest the final rules and regulations which are being formulated to govern the authorized grade crossing work.

The Bureau of Public Roads, under Thomas H. MacDonald, Chief, to which has been delegated the distribution and supervision of spending of the work-relief

funds for highway and grade crossing work, has been concentrating on the development of these rules and regulations. Much has already been accomplished in this regard, and certain general rules and the basis of distribution of funds to projects on the different railways have been laid down, but the detailed rules and regulations as a whole, before being made public, must be approved by the Secretary of Agriculture, in whose department the Bureau is located, and also by the President.

The approval of the rules and regulations is expected in the near future, but until this is given, and the rules are released, actual construction work under the federal program cannot get under way. However, it is not to be assumed that the time thus far awaiting the final release of the rules has been lost because both the states and the railways have been working aggressively on tentative programs and plans to insure putting actual construction under way at the earliest possible date after the "lid is off."

The legislation setting up the \$4,000,000,000 work-relief fund earmarked \$800,000,000 for various classes



of highway work and for the elimination of hazards at railway-highway grade crossings, and it is entirely possible that before the close of the program this much money will be actually spent for these purposes. However, the President's Advisory Committee on Allocations in the first segregation of funds recommended the allotment of \$200,000,000 for highway construction and the reduction of hazards to highway traffic at railway-highway grade crossings, and another \$200,000,000 specifically for the minimizing or eliminating of hazards at grade crossings. The federal legislation also established the basis for the distribution of funds to the states for grade crossing work.

Beyond this, at least as regards the grade crossing program, the specific details of administering the funds, the basis of distribution of the funds to projects on the separate railways, and all rules and regulations to govern the specific character of projects, types of construction and means for carrying out the work in accordance with the purpose of the Relief Appropriations Act, were thrown upon the shoulders of the Bureau of Public Roads.

The Bureau of Public Roads, with headquarters at Washington, D. C., has separate divisions of control, design, highway transportation, management, construction, tests, information, and for handling legal matters. Furthermore, it has district offices, in charge of district engineers, located at Washington, D. C., Albany, N. Y., Montgomery, Ala., Ft. Worth, Tex., Chicago, Omaha, Neb., St. Paul, Minn., Ogden, Utah, Portland, Ore., San Francisco, Cal., and Denver, Colo. With this well-rounded representative organization throughout the states, already grounded in both highway construction and grade crossing elimination work, the Bureau was, unquestionably, the logical and best equipped federal organization to assume direct control over the federal grade crossing program. Already it had effectively directed the distribution of funds for the highway work and for the minimizing of hazards to highway traffic at grade crossings, made available under Title II of the National Industrial Recovery Act and the Hayden-Cartwright Act, and long before the passage of the Emergency Relief Appropriations Act, it, with the cooperation of the railways and state highway organizations, set about to analyze the grade-crossing situation from a national standpoint and prepared detailed lists of grade separation projects which could be started within 30 to 90 days.

Subsequent to the passage of the Act, the Bureau and the states and railways have continued their activity on an increased scale, the Bureau concentrating upon organization and the formulation of rules and regulations which will insure carrying out the work in accordance with the fundamental purpose of the federal legislation, and the railways, individually, in groups, and as a whole through a special committee of the Association of American Railroads, working with both federal and state authorities in the preparation of effective and acceptable programs of work which can be put under way promptly with the release of funds. Furthermore, in spite of lack of knowledge with regard to specific allotments and in the absence of the detailed regulations under which the work is to be planned and carried out, the railways in all parts of the country have formulated, and have submitted to the state highway authorities, tentative plans for large numbers of individual grade separation and grade crossing protection projects, so that there will be a minimum of delay in getting actual work started. At the same time, the highway departments of the different states have been rounding out, in so far as possible, the most effective and desirable pro-

grams from the standpoint of the individual states as a whole.

With the specific purpose of facilitating and expediting the preliminary work in the different states while awaiting detailed instructions, the Bureau of Public Roads, on June 5, gave out several advance general rules with regard to the selection of individual projects, and announced the basis on which the funds will be distributed for programs on the various railways. These will be pointed out later in this article.

#### Apportionment to States and Railways

In accordance with the specific stipulation of the Emergency Relief Appropriations Act, the Secretary of Agriculture apportioned the money allotted specifically for all forms of grade crossing work to the states, one-half on the basis of population according to the latest decennial census, one-quarter according to the mileage of federal-aid highway systems in the states, and one-quarter according to the railroad mileage in the states as determined by the Interstate Commerce Commission. The specific allotments to the different states, as approved by the Advisory Committee on Allocations and the President, were published in tabular form on Page 833 of the *Railway Age* for May 25.

The reasoning behind the basis of distribution of funds to the states, as set up, was, essentially, that population is a measure of unemployment and also of traffic density, and that the mileage of railways and highways in a state is, in general, a measure of the number of grade crossings.

A point with regard to the authorized grade crossing work, understood by some, but apparently not clear generally in the minds of highway and railway men, has to do with the availability of the two \$200,000,000 funds for such work. It has now been established definitely that the money in both funds is legally available for all forms of work to minimize or to eliminate the hazards at railway-highway grade crossings. According to the Bureau of Public Roads, the \$200,000,000 fund often spoken of loosely as for the separation of grades at railway-highway grade crossings, is available not alone for this purpose, but also for grade crossing protection, the elimination of grade crossings through the relocation of highways, and the alteration or improvement of existing grade separation structures. No part of this fund is available for strictly highway work.

On the other hand, it is pointed out by the Bureau, that while the other \$200,000,000 fund, commonly referred to as the highway fund, is intended primarily for carrying out highway projects, the law specifically gives the states and the Bureau the right to use any part of it for any of the various types of work that will minimize or eliminate the hazards to life at railway-highway grade crossings.

Another point established in connection with all of the various types of grade crossing work authorized is, that the funds allocated to the states for these types of work are to pay the entire cost of the work, from field engineering and design through to completion, exclusive of any charges for right-of-way and property damages, which charges must be taken care of by the states and the railroads. This point is specifically stated in the Appropriations Act, and since the passage of the act has been voiced by the President, the Secretary of Agriculture, and the chief of the Bureau of Public Roads.

Another essential point from the standpoint of the individual railways in preparing programs was cleared up early in June. This has to do with the amount of the funds allocated to the different states that each road can expect to be spent on its lines for grade crossing work.

In attempting to insure a reasonably equitable distribution of the benefits of the work to the various railroads operating in the different states, the Bureau of Public Roads set up the following rule of distribution, which was forwarded to its district engineers as advance information on June 5: That grade separation projects within a state shall be apportioned, within practical limits, to the several railroads in the state in such manner that the total cost of the project or projects for the elimination of grade crossing hazards on any individually operated railroad will have approximately the same relation to the total apportionment to the state as the mileage of that railroad owned or operated in the state bears to the total mileage of all railroads owned or operated in the state.

While the Bureau had the steam railways specifically in mind in setting up the above basis of apportionment, it has pointed out that the mileage of high-speed electric lines may be considered by the states in programming projects, in which case the total mileage of steam and high-speed electric lines may be used in calculating the division of funds. If this is done, however, this fact must be reported by a state in submitting the first increment of its grade separation program. It has also been pointed out by the Bureau that nothing in this general method of distribution shall operate to prevent the elimination of hazards at main-line crossings on individual railroads which may have only a relatively small mileage in a state.

In view of the exceptions set up, the specific amount of money which will be expended on each individual road for the elimination of hazards at grade crossings, both on its lines as a whole and in any particular state, is quite indefinite. However, the general basis of distribution gives each road an approximation of the amount of federal funds which may be expended on its lines for grade crossing work. For example, except as modified in accordance with the above, a road with, say, 2,900 miles of lines in a state which has 8,250 miles of lines of all roads, and to which has been allotted  $13\frac{1}{2}$  million dollars, can count on grade crossing work to the extent of approximately 35.1 per cent of the state's total appropriation, or, in the neighborhood of \$4,765,000.

On the other hand, a road with a relatively small mileage in the same state can expect to receive the benefit of only a relatively small proportion of the funds available in that state, unless, as provided for, it is decided to give consideration to the elimination of any particularly hazardous main-line crossings on the relatively small mileage of such a road within that state.

After figuring the amount of money from the grade crossing funds that may be made available for work on each road in each state under the basis of distribution set up, it is a relatively simple matter to determine the approximate amount of money which may be applied to grade separation work on individual roads as a whole.

#### Some Principles Already Established

Unquestionably, there will be a considerable number of conditions to be met by each individual grade crossing elimination or protection project to be undertaken with the federal funds, particularly in view of the primary purpose of the act, but only two fundamental rules have been set up that must be met by the states to make their allotments accessible. These, as set forth by the Secretary of Agriculture, are, first; that the funds appropriated will not be available for expenditure in any state until a program of projects proposed to be undertaken in the state shall have been submitted by its highway department and shall have been approved by the Advisory Committee on Allotments, and second, that no individual project will be approved for construction in any state until the highway department of the state has submitted

and has obtained approval of a program of projects that will absorb substantially all federal emergency funds previously apportioned.

Subject principally to these conditions, the Secretary has pointed out, the funds are available for immediate expenditure, and will be administered through the Bureau of Public Roads. He has also stated that the expenditures are to be made through the state highway departments of the several states, as provided for specifically in the Emergency Relief Appropriations Act, under the provisions of the Federal Highway Act of November 9, 1921, as amended and supplemented, and subject to the provisions of Section 1 of such Act of June 18, 1934. This federal highway legislation, as it may affect the work to be done under the proposed grade crossing elimination program, merely makes all plans and construction subject to the approval of the Secretary of Agriculture.

As regards the selection of specific grade crossing separation projects, there appears to be few limitations. The chief of the Bureau of Public Roads has advised his district engineers that grade separation projects in the different states may be selected without limitation as to location, except that not less than 25 per cent of a state's apportionment shall be applied to crossings of secondary or feeder roads, which roads, for the purpose of grade crossing regulations were defined as including roads outside of municipalities or streets within municipalities, which are not included in the approved system of federal-aid highways or extensions thereof. This definition, for all practical purposes, means that there is to be no restriction regarding the location of grade crossing elimination projects, so that, except for the specific limitation stated, they may be selected entirely with regard to relative traffic hazards and the possibility of providing employment in areas where relatively large unemployment exists.

Several additional limiting influences seem certain, however, in connection with the approval and carrying out of individual projects. In the first place, in view of the fundamental purpose behind the Emergency Relief Appropriations Act—prompt and widespread employment for those on relief rolls—so dominant in the mind of the administration at Washington, it seems certain that the Bureau will give preference to projects which will employ the highest percentage of the money expended for labor, and which can be started promptly and carried forward at a rapid rate.

It seems certain also, that the Bureau will give weight to the number of nearby crossings that can be closed outright, without cost, or at small cost, in connection with specific separation projects, and further, that it will insist upon the complete elimination of every semblance of a grade crossing where separation is effected. In other words, it will be urged by the Bureau, in all probability, that unwarranted nearby grade crossings be closed in connection with grade separation projects, and that no private or secondary grade crossings be established or be permitted to remain where the highway is carried over or beneath the tracks.

In view of the mounting number of grade crossings in the country during recent years, in spite of all of the grade crossing separation work that has been done, it is most likely also that the Bureau will urge upon the states many grade crossing eliminations through the relocation of highways, and will enlist their co-operation in refusing to open any new crossings, except upon showing of the most urgent necessity.

#### Railroads to Play Large Part

While it has not been established definitely, it appears assured that the federal bureau will not attempt to dictate the method of carrying out individual separation



projects, that is, whether by viaduct or subway, or in the case of protection, the specific means of protection to be employed, preferring to leave these factors largely to the judgment of the states and the railroads. Likewise, it appears certain that the states and the railways will be given a practically free hand in the detailed design of structures and in the selection of materials to be employed, leaving the way open for the use of steel, concrete, treated timber, or any combinations of these or other materials, which may seem desirable or justifiable in view of local circumstances or conditions, and compatible with the administration's desire to give first consideration to labor. This will be in line with the provisions of the Federal Highway Act of November 9, 1921, referred to previously, which merely calls for durable construction which meets adequately the existing and probable future traffic needs.

According to specific stipulation in the Emergency Relief Appropriation Act, however, the acquisition of all materials, articles and supplies used in the work is subject to the provisions of Sections 2 and 3 of Title III of the Treasury and Post Office Appropriation Act, fiscal year 1934. The essence of these sections is the requirement that government departments, contractors, subcontractors, material men and suppliers shall use only such materials, manufactured and unmanufactured articles, and other supplies on federal financed work as have been mined, produced or manufactured in the United States, unless to do so shall have been determined by the proper authorities to be inconsistent with the public interest.

While these appear to be the only requirements with regard to the purchase of materials at the present time, the possibility of further requirements, which might materially complicate matters unless offset by Executive order, is contained in a bill introduced in the United States Senate on June 14, by Senator Walsh of Massachusetts, which would not only require that contractors carrying out projects with federal money accept minimum wage and maximum hours standards set up, but which would restrict the purchase of all materials and supplies to those companies, parties or concerns, which likewise agree to prescribed wage and hours agreements.

In the previous work carried out, in whole or in part with federal funds, the Bureau of Public Roads has shown little concern with regard to which party, the state or the railway, does the actual design work and primary engineering on grade separation projects, and it is expected, therefore, that it will maintain the same attitude under the new grade crossing elimination program, assuming that any requirements laid down are met. Thus, as in the past in practically all of the states, it is to be expected that the railways will be permitted, as is their desire in practically all cases, to design those structures which will carry railroad loadings, and may be called upon also to design a large number of viaduct or bridge structures carrying highways over the tracks.

In those states with highly organized highway departments, many of the latter type of structures will, undoubtedly, be designed by these departments, but in certain other states, with less highly organized or well-established highway departments, it is probable that the highway authorities will desire that even the structures for highway loadings, if carried over the tracks, be designed by the well-organized forces of the railways. In any division of the design work, it may be assumed that, as has prevailed so generally in the past, each party, the railroad or the highway department, will be given an opportunity to criticize and approve the plans prepared by the other.

That there must be full accord between the state

highway departments and the railways in all phases of programs and projects submitted to the Bureau of Public Roads is made clear by the chief of the Bureau in a memorandum dated June 7, in which he stated the following, referring to grade crossing work:

"The regulations that are being drawn to govern the use of funds for these purposes, require complete co-operation between the state highway departments and the railroad companies before approval will be given to the proposed projects. This means that before the federal funds may be used for these purposes, agreements must be reached between the departments and the railroads on a basis that is mutually acceptable."

### Organization Simple

The specific organization for handling the expenditure of the \$200,000,000 apportioned for grade crossing work will be relatively simple. As before stated, it will be headed by the U. S. Bureau of Public Roads which, with its 12 district offices throughout the country, will approve and regulate all expenditures, and will act as intermediary between the states and the railways on the one hand, and the Advisory Committee on Allocations and the President on the other. In the organization set up, all programs on their way to final approval by the Committee on Allocations and the President must pass through and be approved by the Bureau's headquarters at Washington. However, to decentralize its work as much as possible, and thereby minimize any possibility of congestion, the district offices of the Bureau will be used to the fullest extent in maintaining direct contact with the states and the railways and in handling the preliminary details of all matters to pass through the Bureau.

In the specific set-up devised, the headquarters of the Bureau will act largely in an administrative capacity, and, having laid down all of the fundamental principles and general rules to govern the work, will act largely as a clearing house for passing upon and securing final approval of the programs submitted through its district offices. The district offices, on the other hand, will administer all of the field functions of the Bureau in their respective territories.

All programs of work and detailed plans for individual projects in the different states will be handled through the district offices, which will be in a position to guide and direct the individual states and railways in the formulation of acceptable programs and plans for separate projects. Thus far, the only specific requirements established by the Bureau in connection with the submitting of programs and plans are that they must be accompanied by information with regard to the number of men to be employed (manhours), and a statement of the estimated cost and of the quantity and character of materials required.

After the district offices have made careful examination of programs submitted, on the ground, if necessary, to see that the individual items conform with the rules and regulations of the Bureau for grade crossing work, they will forward the programs, with recommendations, to the Bureau's headquarters at Washington. Here, each program will be carefully checked again, special attention being given to see that it is eligible under the statutory requirements of the Emergency Relief Appropriation Act, and conforms to all of the rules and regulations which may have been set up by the Bureau. Here also, the grade crossing program for the country as a whole will be correlated, and an attempt will be made to promote activity in all of the states. Detailed plans and specifications for each individual project will not pass through the Bureau's headquarters, checking



and approval of these being left to the different district offices.

Having received the approval of the Bureau's headquarters, individual programs will be submitted, in turn, for approval, to the Division of Applications of the National Emergency Council, the Works Progress division, and the President. When the President approves a program, it will then be sent back to the Bureau of Public Roads for handling with the states.

The formality of letting all contracts for work to be done with the federal money will be in the hands of the state highway departments.

### Labor, Wages and Hours

While the details to govern the actual execution of the design and construction in connection with individual grade separation projects will, unquestionably, be left largely to the determination of the state highway organizations, working with the railways, several general rules and regulations have already been laid down by the federal bureau in accordance with the letter or spirit of the Emergency Relief Appropriation Act, and in the executive order of the President dated May 21, Rules and Regulations No. 1 relating to wages, hours of work and conditions of employment under the emergency relief appropriation. These rules and regulations, in general, apply to all phases of grade crossing work.

In the first place, the requirement has been set up that 90 per cent of the persons employed on any project shall be obtained from relief rolls, allowing 10 per cent of the employment for administrative, supervisory and highly skilled positions, not readily filled from relief rolls, to come from regularly employed forces or organizations. The wages to be paid on grade separation work will not be subject to the wage scales set forth in the executive order dated May 21, which established schedules of monthly earnings in various types of areas throughout the country for various classes of relief work under the federal works program, it being stated specifically in that order that minimum wage rates on highway and grade crossing elimination work under the supervision of the Bureau of Public Roads and state highway departments, shall be determined by the state highway departments in accordance with local wage conditions, subject to the approval of and in conformity with standards fixed by the Bureau of Public Roads.

It is also stated specifically in that order that—except in the case of an emergency involving the public welfare or the protection of work already done, special or unusual circumstances, and in the case of advisory and administrative employees—the maximum hours of work for manual labor on grade separation projects shall be 8 hours per day and 130 hours per month, and that the maximum hours of work for clerical and other non-manual employees shall be 8 hours per day and 40 hours

per week. The executive order of May 21 also set forth a number of conditions of employment on the federal financed work, and a second order, dated June 5, prescribed in further detail rules and regulations relating to the employment of workers on projects to be carried out under the Emergency Relief Appropriation Act.

### High Labor Requirements

Possibly the most far-reaching stipulation with regard to the proposed highway construction and grade crossing work to be done under the Relief Appropriation Act, is that issued by the Bureau of Public Roads on June 5, which stated that all projects will be measured for approval on the basis of \$1,400 total expenditure for labor, materials and incidentals per man per year, or on a basis of 40 per cent of the total cost, including cost of property, to go to labor employed directly on the project. This requirement has caused wide concern among the state highway departments and the railways, where it is felt that the high percentage set for labor will, unquestionably, be the stumbling block to many projects, and even programs which, unless calculated to be done in less than the most efficient manner, will require a larger expenditure than \$1,400 per man per year for all costs.

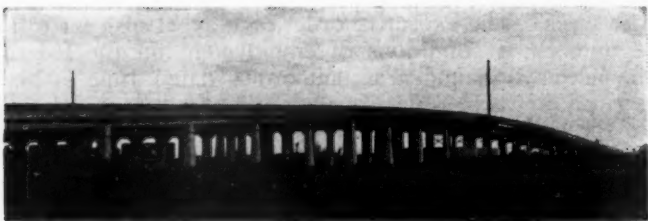
In a memorandum dated June 7, dealing with this concern, Mr. MacDonald, Chief of the Bureau of Public Roads, pointed out not only the necessity for the high labor requirement, but also the spirit of the entire administration in the restrictions and requirements which have or will be placed upon work carried out with the work relief funds. After reminding those addressed that employment of those on relief rolls is the paramount goal of the \$4,000,000,000 relief fund, and that the extent of the desirable public works accomplished must be secondary to that goal, he analyzed the total appropriation in the light of the 3,500,000 employable persons on relief rolls to show that this permits an average expenditure of only \$1,140 per individual per year. In spite of this figure, he pointed out, the more liberal maximum of \$1,400 expenditure per man per year was placed on highway construction and grade crossing work specifically to give greater stimulus to these important classes of work than would be possible otherwise, recognizing fully that in so doing, certain other classes of relief work must get along with a maximum expenditure per man per year somewhat below the average of \$1,140.

At the same time, recognizing that there is cause for real concern, the Bureau of Public Roads, under Mr. MacDonald, is, as pointed out at the outset of this article, seeking the approval of an alternate plan, which will waive the \$1,400 stipulation in those states which will guarantee to underwrite employment of those on the relief rolls at least to the extent that would result if the \$1,400 stipulation was maintained in full effect.

## Structures for Grade Separations

The design of grade separation structures requires the application of a specialized branch of bridge engineering. Every grade separation problem imposes the task of meeting certain established requisites as to side and overhead clearances, approach grades, etc., and the difficulty of solution depends not only on the severity of these requirements but also on the extent of which local topography presents natural advantages or offers serious obstacles to the development of a satisfactory and not-too-costly plan.

The essential principles involved, and the expedients that may be employed to meet conflicting requirements are so well known that they need no elaboration here. It suffices to say that while the experience of recent years has brought forth no revolutionary changes in design, the trend of grade separation work in recent years has been of such a nature as to present a decidedly different aspect from that which confronted the engineer of grade separation as recently as 10 years ago. Whereas funds for grade separation in the past were absorbed



Many Highway Over-Crossings Are Being Constructed of Concrete

largely by multiple-crossing projects in the larger cities, more attention is being given today to the elimination of individual highway crossings. The primary reason for this is obvious—the marked increase in the volume of traffic on main highways—but there is still another reason in the concurrent objective of federal appropriations. Individual projects of moderate cost afford a wider distribution of employment than projects involving heavy expenditures in a limited area.

There is, moreover, a distinct difference between the essential elements entering into the solution of individual and multiple-crossing projects. The latter or urban type of project is generally solved most economically by a change in the track grade—usually by track elevation, with only minor changes in the street grades, while the single-crossing or rural project is carried out almost invariably by elevating or depressing the highway, with little or no change in the track grade.

#### Wider and Straighter Highways

Still another change in the character of the problem presented arises from the more exacting conditions imposed by the highway authorities. The width of highway traffic lanes has increased progressively from 8 ft. to 9 ft. and later to 10 ft., and whereas roads of more than two traffic lanes were formerly the exception, there are now many four-lane highways. In the past, prompted by a desire to avoid excessive costs of construction, highway authorities not infrequently consented to relocations of the road for the purpose of obtaining a more favorable intersection angle than the sharp skew of the existing grade crossing or to take advantage of some local topographic features, but they now contend that the introduction of curvature in a highway results in an appreciable increase in hazard and usually insist that the design of the structure must fit the most favorable location for the highway. This almost invariably requires a more complicated and more costly structure.

The same considerations have led to the almost complete prohibition of piers or bents within the width of the roadway in a subway. Such obstructions are a source of some added hazard on rural highways or on city streets or boulevards carrying high speed traffic, but structures designed to avoid their use in extremely wide highways, especially where the crossing is on a skew, cost a great deal more than a structure in which multiple spans are permitted.

One result of the insistence on these more exacting requirements in the design of grade separation structures has been the postponement of projects offering promise of excessively high expenditures in order that the available funds may be spent in the elimination of grade crossings in locations where conditions are more favorable to economical construction. This has had the effect of leaving for later consideration projects that average appreciably higher in cost than those which have been completed up to the present time. Statistics on the average cost per grade separation are therefore misleading as a measure of the cost of future separations, since the projects now scheduled for consideration in-

clude many of these more costly structures, which have been held up because of inadequate funds.

Another factor that has been injected into the problem of grade separation with the advent of federal appropriations for this purpose is the change in the attitude of state highway authorities concerning the relative degree of permanence of the construction. Whereas the fact that the state, the municipality, or both, had to share some portion of the cost introduced a considerable incentive toward economy of construction, even to the extent of favoring the use of timber frame overhead bridges or pile piers for the support of spans carrying the railway over the highway, present sentiment favors the more permanent types of construction for the purpose of reducing maintenance expenditures in the future. The influence of federal money is seen also in the pressure that is being exerted in some quarters for structures embodying elaborate architectural treatment.

#### Over or Under?

Whether the separation of an individual grade crossing is to be effected by carrying the highway over or



There Are Now Many Four-Lane Highways

under the tracks is determined in perhaps 90 per cent of the cases by local topographic conditions. In prairie country the obvious solution in the vast majority of cases is the over-crossing, while in rolling country conditions not infrequently favor an under-crossing; and in general, it may be said that the decision is usually predicated on the relative elevations of the highway and the railroad in the immediate vicinity of the grade crossing. Whether the over-crossing or the under-crossing is to be favored, where conditions are such that the cost of the two types of separation is approximately the same, is not definitely established. Some railway engineers favor an over-crossing for the highway because this solution leaves the tracks entirely on roadway. On the other hand, other railway engineers favor a subway because they feel that any construction over the tracks or the presence of supporting columns for a highway bridge introduces some measure of added hazard to railway operation.

Although many viaducts for highway over-crossings have been designed by railway engineers and constructed under their supervision, agreements effected in the course of negotiations entered into by railway officers and the public highway authorities with respect to the use of federal funds for grade separation projects commonly provide that the structure to carry railway tracks, i. e., the subway, shall be designed by the railway organizations, and that the highway structure over the tracks shall be designed by the highway engineers. As a result, the selection of the type of design and the choice of materials for over-crossings is largely the province of the highway authorities.

#### Over-Crossings

This does not mean that the railway engineers exercise no control whatever over the design and construction



of these bridges, as their responsibility for the safety of train operation and the protection of the railways' interests demands that the plans be examined to insure that clearance requirements are fulfilled, that no unsafe construction methods are involved, that the design does not embody encroaching embankment slopes, that supporting bents or piers do not block side ditches, or that the railways' interests are not adversely affected in other ways. However, as the state highway commissions are usually required to assume responsibility for the maintenance of the structure, they have the primary interest in the general type of construction to be adopted. On the other hand, accumulated experience in the maintenance of structures over railway tracks has given the railway bridge engineer a degree of judgment not always possessed by the highway engineers, and the former have had occasion to call attention to opportunities to improve the design or details, for example, the requirements of smoke blast plates—to cite a single example.

The reinforced concrete trestle is probably the most popular type of structure for a square or nearly square crossing over one or two tracks, flanking spans being provided to carry the roadway to bank blocks or abutments at the top of cut slopes or at the ends of approach embankments. In not a few cases steel beams encased in concrete are provided in the spans over the tracks unless the spans are of such length as to require the use of girders or trusses. Creosoted timber trestles have been built for over-crossings for many years, and more recently a number of them have been provided with a concrete slab in lieu of a plank floor, while in some cases creosoted pile bents serve as the support for steel beams and reinforced concrete slab spans.

#### Under-Passes

Because the subway structures carry railway tracks and are usually maintained by the railways, their design



Efforts to Minimize Curvature in the Highway Give Rise to Many Skew Crossings

is almost invariably the province of the railway engineers, and in the course of efforts to meet the particular problems presented in the projects that have been completed through the years almost every conceivable type of construction embodying the use of metal, stone, concrete and timber has been employed. Experience has disclosed the shortcomings of the earlier structures, which, in the main, may be characterized as defects in details that have given trouble in maintenance. Inadequate provision for drainage, faulty waterproofing, and details that encourage corrosion or interfere with thorough inspection, proper cleaning and effective repainting are among the deficiencies that have been disclosed in service. Out of this, there has been developed a technique of subway design that has exerted a profound influence on the practice of recent years.

This influence, however, is reflected primarily in setting up certain requirements that must be met in proportioning the details of the structure. It has had little

effect in the way of a standardization of details and almost none whatever in the selection of the general type of bridge, for subway construction is still characterized by a wide diversity of designs.

#### Special Requirements

The problems presented in the design of the substructure of a subway are not unique; the abutments are like other abutments except that more elaborate provision must be made for drainage, and piers or bents (where permitted), must be narrow. But the design of the superstructure imposes many conditions other than the primary requisite of carrying the imposed loads without exceeding established conventions as to stresses and deflections. The floor must be solid and therefore embody provision for waterproofing and drainage, and in most cases there are severe limitations as to permissible floor thickness which not only impose special problems of floor design, but in long spans carrying multiple-tracks, introduce the problem of avoiding the use of through girders of such depth as to require a spreading of the tracks.

Projects in terminals introduce an added restriction in that anything other than a deck structure is objectionable because of the limitations imposed on the location of turnouts, crossovers or future changes in the location of tracks. Still another complication is the fact that solid floor construction usually introduces special problems in erection under traffic, although there is a wide difference in the relative difficulty imposed with different types of structures.

This formidable list of conditions has not militated against the use of rather widely diversified designs, including steel-beam spans, deck girder spans, through girder spans, concrete slab spans and concrete fixed-frame structures. The choice of floor construction for the steel structures includes concrete encasement of longitudinal beam spans, concrete slabs on top of longitudinal beams or girders, or the transverse beams of a through girder span, or, in a few cases, the use of creosoted wood planking, while within the last two or three years metal plates, usually wrought iron, have been used as a means of decreasing the floor thickness. The selection of the type of construction is dependent to a considerable extent on the conditions presented in the particular case, but is influenced to a remarkable degree by individual preferences.

#### Longer Spans

Probably the most important influence affecting the choice of designs that has been brought to bear in recent years is the pronounced increase in the length of spans to accommodate wider highways, the strictures against intermediate supports and the increasing reluctance of highway authorities to approve relocations that will reduce the angles of skew. This has decreased the oppor-



Highway Authorities Object to Intermediate Supports in the Roadway





Structural Members Must Not Encroach on the Operating Clearance

tunity for the use of reinforced concrete slab spans, which run into excessive depths and weights in spans exceeding about 25 ft. The rigid-frame concrete structure on the other hand, has been applied under railroad loading for a span as long as 72 ft.

Much more common, however, is the deck span of wide-flange beams which can readily meet the requirements of a clear crossing of a 40-ft. four-lane highway unless the floor depth limitation is too severe. Competing with this type of span is the so-called half-through girder structure with a transverse I-beam floor. This type of construction will, in most cases, provide a shallower floor than the longitudinal beam span and is capable of meeting the requirements of a much wider range of span lengths in the face of limited latitude as to depth of floor. In fact, resort must be had to some adaptation of this type of construction in all extreme cases, the tracks being spread where this is the only means of preventing the girders of the depths required from encroaching on the operating clearance.

A deck of concrete has a marked advantage in the ease with which the top surface may be shaped to provide the requisite slopes, gutters and curbs to facilitate drainage and receive the waterproofing. Encasement of the steel members reduces the total floor depth required as compared with the superimposed concrete slab and is believed by some engineers to insure more substantial construction. It is also favored on the ground of appearance, but results in an appreciable increase in the dead load and will usually prove more expensive than the superimposed slab.

### Plate Decks

Because the design of a suitable superstructure for a subway is often a matter of inches of floor thickness, even the five or six extra inches of depth occupied by the concrete slab may be enough to preclude the adoption of a given design, and this predicament has been encountered with sufficient frequency to have suggested the substitution of a metal deck plate for the concrete. Most of such designs have embodied the use of wrought iron, although copper-bearing steel has been employed in some cases. This construction should not be confused with the deck plate construction employed in some of the early



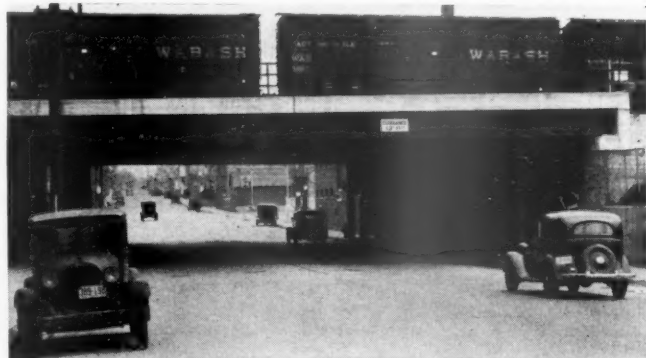
Treated Timber Structures Have Been Used Extensively for Highway Over-Crossings

track elevation structures, especially in Chicago, where the plate served simply as an exposed flooring between rails supported directly on the structural floor members. In the present case the deck plate forms the support for ballast and is usually protected by waterproofing. Another type of thin floor involves the use of steel channels laid flat, with the flanges alternately up and down for the purpose of interlocking them.

The plates or channels are usually attached to the floor beams by welding to present a smooth unbroken surface, and if plates are used, they may be bent up along the sides to provide the equivalent of a curbing or flashing. However, the development of lateral or longitudinal slopes for drainage is not so readily accomplished. For longitudinal beam spans, one railroad introduces gutter-shaped plates along each side of the tracks that fit into the spaces between the flanges of adjacent beams. Another introduces a light metal grillage on top of the beams that provides laterally sloping supports on which the plates are laid.

Concrete-filled metal grillages afford means of obtaining a shallower slab than those now ordinarily provided. These have been employed on ballast deck railroad bridges but, thus far, no application has been reported of their use on grade separation structures.

Creosoted wood floors, like the plate floors, can be sloped only if special means are provided, and this usually is not done. Moreover, asphalt waterproofing, if provided, must be protected from injury by the creosote.



Steel Beam Spans With a Concrete Deck Are Widely Used

On one road, this has been done by introducing treated one-inch ship-lap between the creosoted plank and the waterproofing and this is held in place (because nailing is precluded) by means of wooden cleats nailed against the inside faces of curb timbers that are spiked to the ends of the floor planks. Another road covers the planks with mastic that is given slight lateral slopes from the center line of the floor for drainage.

### Other Factors

Waterproofing is an essential element of grade separation work and it is not too much to say that the present state of the art in this field must be ascribed largely to the development that has followed experience in the application of waterproofing to the floors of subway structures. The essentials for success embrace not only high quality of the materials and skill and painstaking care in application, but also minute attention to the details of flashings, expansion joints, and adequate slopes for drainage.

Because the water that falls on a solid bridge floor is usually carried over the back walls, the amount of water that must be disposed of behind the abutments is much greater than in the case of abutments supporting open-

floor bridges. Consequently, such expedients as backing the abutments with dry stone walls or the use of pervious backfilling do not ordinarily fulfill the requirements of adequate drainage. Good practice usually demands direct outfall pipe drains for the water from the bridge floor, not infrequently with perforated half-pipe over the gutters

in the floor itself. In addition, it has become almost a standard practice to provide some form of perforated pipe, disposed horizontally at one or more levels against the backs of the abutments, with connecting vertical runs, catch basins, etc., so that a thorough-going system of drainage is assured.

## Highway Crossing Protection

That the installation of protective devices at railway-highway grade crossing affords an economical means of minimizing the hazard to highway users and thereby fully justifies the appropriation of federal funds for this purpose, was recognized in the Emergency Relief Appropriation Act of 1935, which specifically mentions among authorized activities "the elimination of hazards to life at railroad crossings, including the separation or protection of grades at crossings." Of the \$800,000,000 appropriated for highway and allied work, \$200,000,000 has been allotted specifically for the elimination of existing hazards at railway-highway grade crossings, which designation has been interpreted definitely by the U. S. Bureau of Public Roads (as is pointed out clearly in the second of this group of articles), to include the installation of protective devices at grade crossings, as well as the outright elimination of grade crossings through grade separation and the relocation of highways.

In addition to the above fund an additional \$200,000,000 has been allotted specifically for highway construction, and while this second sum will be used, undoubtedly, largely for strictly highway work, the Bureau of Public Roads has made it clear that there are no legal restrictions whatever to employing money from this fund for grade crossing protection work, or any other form of work designed to minimize or to eliminate existing hazards at railway-highway grade crossings.

### The Need for Protection

The complete separation of grades between highways and railroads is, of course, the ultimate in safety. However, with more than 235,000 grade crossings in the United States, it is evident that it is impracticable to eliminate any considerable proportion of the total. Furthermore, local conditions, such as adjacent buildings, intersecting streets, etc., make it impracticable to separate grades at some points. Likewise, at many crossings, the density or nature of the traffic on the highway or the railway, or both, reduces the hazard to such an extent that the expense for separation is not warranted. On the other hand, the cost of providing crossing-signal protection varies from \$2,500 for a single-track project in non-automatic block territory to \$4,000 or more for a multiple-track project in automatic block signal territory. Using an average figure of \$3,000, at least 25 crossings can be protected for the cost of one grade separation.

### Large Volume of Work to Be Done

According to the latest information available, only about 30,400 of the 235,000 crossings in the United States are protected by other than fixed signs. Of these, about 4,700 are protected by gates (of which 2,800 are in part-time operation), 1,200 by watchmen full time and 5,000 by watchmen part time, 16,700 are protected by automatically-controlled visible signals and 3,600 by audible signals.

In many states, highway authorities have co-operated with railroad representatives in investigating the crossings which should be equipped with protection. A rough



The Installation of Protection Will Afford Maximum Increased Safety per Dollar Invested

estimate indicates that something like 20,000 of the 194,600 crossings not now protected by other than fixed signs, handle traffic warranting automatically-controlled protection. Furthermore, 3,600 crossings are now equipped with audible signals only (bells), and in many of these instances greater benefit would be secured by adding visible signals at these crossings than would be accomplished by making complete new signal installations at other crossings. In recognition of this fact, the state of Pennsylvania has recently inaugurated a program of modernization of the protection at several hundred crossings at public expense.

### Precedent Established

If precedent is desired for the use of federal funds for the installation of crossing protection, Section 204 of Title II—Public Works and Construction Projects of the National Industrial Recovery Act of 1933 gives such recognition. In the application of this act, Thomas H. MacDonald, chief of the Bureau of Public Roads, advised federal and state officers that "grade crossing protection by installation of satisfactory and approved warning devices such as signals, lights, etc., at crossings, which cannot be eliminated economically, serves to minimize hazards to traffic. Public works highway funds may be used to pay the entire cost of such approved installations in accordance with proper plans and specifications." Mr. MacDonald added that "we will accept the specifications for materials and electrical work prepared by the railroad companies as it is believed that their signal departments can be relied upon properly to take care of these features of the work."

Of the \$600,000,000 of public works funds authorized



for highway purposes under the acts of June 16 and June 18, 1934, approximately \$3,000,000 was allocated by 20 states for the protection of 1,223 grade crossings, as shown in detail in the accompanying table. Since that time Florida, South Carolina, North Carolina, Georgia, Alabama and Virginia have started negotiations for a second program involving about 80 additional crossings, while New Jersey has announced a program involving protection at 274 crossings.

### Work for the Unemployed

A further expansion of this program of grade crossing protection is included as a part of the Emergency Relief Appropriation Act. The primary purpose of this Act is

1934 Programs of Crossing Protection Listing Projects Completed, or Under Construction or Negotiations in 20 States at Federal Expense

State	Approx. Amount	Approx. No. Crossings
Alabama .....		16
Florida .....		39
Georgia .....		12
Illinois: Signals .....	\$475,000	297
Reflector signs .....	25,000	354
Michigan .....		28
Minnesota .....	30,000	12
Mississippi .....		6
Montana .....		2
Nebraska .....	1,650	1
New Jersey .....		274
New Mexico .....		1
North Carolina .....	250,000	90
Oklahoma .....		2
Oregon .....	16,000	8
Pennsylvania .....	6,500	4
South Carolina .....	50,000	*16
Utah .....		8
Virginia .....	35,000	*11
Washington .....	14,000	7
Wisconsin .....	100,000	*35
		1,223

\* Approximate.

to provide work for men now unemployed and on public relief. It is of interest to note that approximately 1,000 man-hours of labor are required for the field construction incident to an average installation of highway crossing protection. Ordinarily such work is done by railroad signalmen, many of whom have been out of work for so long that they are now on public relief. As a result, in most communities, a sufficient number of trained signalmen can be drawn from the relief rolls to do the strictly signal work involved. On one large signaling project now under way, 135 of the 167 signalmen employed were taken from relief rolls. Furthermore, much of the work to be done at the crossings, such as the digging of holes and trenches, the mixing of concrete and the erecting of supports for the apparatus, can be performed by common labor drawn from local relief rolls.

Therefore, the stipulation in the regulations of the Act to the effect that 90 per cent of the labor be drawn from relief rolls can be met with grade crossing protection projects. Likewise, a second stipulation that at least 40 per cent of the cost of a project shall go for labor employed at the site of construction, can be met. On a crossing signal installation made by highly efficient railroad forces, 30 to 35 per cent normally goes for labor, and when men from relief rolls, unfamiliar with the methods of construction on a particular road, are employed, the percentage for labor may easily exceed the stipulated 40 per cent in many cases.

Assuming an average of 1,000 man-hours of labor for

each of the 20,000 needed projects of grade crossing protection, mentioned previously, the installation of these signals would require a total of 20,000,000 man-hours of labor, which, at 40 hours per man each week, would take 20,000 men off of relief for 25 weeks.

### Kinds of Protection Needed

In determining the kind of protection to install, it is possible to select from various types of protection to meet local conditions most economically. The vast majority of highway drivers will observe proper precautions if they know that they are approaching a railroad crossing and, therefore, as determined by the Erie railroad, adequate approach warning signs and the use of button-type reflectors on standard crossbuck "railroad crossing" signs serve a very useful purpose in reducing the number of accidents at crossings where the volume of highway traffic or the number of trains does not warrant automatically-controlled devices. The state of Illinois has recognized this form of protection by providing for the installation of button-type reflector crossbuck signs at 354 crossings as a part of its protection program, which also includes the installation of signals at 297 other locations.

Beyond adequate signs, the next step is to illuminate the crossbuck signal and crossing layout prior to the approach of and during the passing of trains. This is being done to a limited extent on certain roads in an effort to reduce the number of accidents in which automobiles are driven into the side of a train.

The next type of protection, in order of effectiveness, is the automatic track-circuit-controlled signal, various approved types of which are already in extensive use throughout the country. Such protection, where adaptable, serves adequately to protect highway traffic except in the comparatively few instances where careless drivers fail to observe the warnings or try to beat a train to a crossing.

Some authorities contend that it is unreasonable to attempt to prevent accidents of the type just mentioned. However, under certain circumstances where buildings or other obstructions prevent highway vehicle drivers from seeing trains approaching at high speeds, and, likewise, in built-up residential or business sections, it is contended by some that some type of an obstruction is needed to prevent vehicles from approaching the crossing. Gates have been used for this purpose at crossings for years, and recently the use of power-operated gates controlled automatically by track circuits, or in groups from a centrally located tower, has reduced the operating expenses of such protection. Barriers have also been developed to prevent vehicles from entering on the tracks. The fundamental objection that has been raised to these is the liability of injury to occupants of the highway vehicles. This objection, however, has been overcome to considerable extent in recent designs.

THE NEW YORK, NEW HAVEN & HARTFORD has inaugurated throughout Massachusetts and on two runs into Rhode Island an experimental, one-day, round-trip, coach fare of one and one-tenth times the one-way rate. These rates are in effect between Boston and all cities in Massachusetts and also between Boston and Providence, R. I., and intermediate points and between Boston and Newport, R. I., and intermediate points. The low rate tickets are valid for travel either to or from Boston and are also accepted on the Comet, the New Haven's new streamlined train which is now operating between Boston and Providence. The reduction, the New Haven statement says, is in the nature of an experiment "to determine the effect reduced fares would have on passenger travel."



## Co-ordinator Law Extended One Year

WASHINGTON, D. C.

JOSEPH B. EASTMAN, federal co-ordinator of transportation, this week entered upon his third year of activity under the provisions of Title I of the emergency railroad transportation act, 1933, following passage by the House on June 14 of the resolution passed earlier in the week by the Senate continuing in effect that part of the law until June 17, 1936. Titles II and III of the act were permanent legislation, including the repeal of the recapture clause of the transportation act and certain regulations relating to railroad holding companies. The House committee on interstate commerce had reported the resolution with an amendment eliminating Section 2 of the resolution, which provided for a \$2 a mile assessment against the railroads, or about \$530,000, to meet the expenses of the co-ordinator's organization, but no particular fight was made on that point in the House and the amendment was rejected, after which the resolution was passed in the form in which it had come from the Senate and was signed by the President later in the day.

Mr. Eastman announced that since much of the research work undertaken by his organization is done, although many of the reports prepared have not yet been entirely completed or are still to come from the printer, "the time has come to translate its results into action," but he was not ready to announce at once his prospective program for the coming year. He planned to hold an early conference with the Regional Co-ordinating Committees representing the railroads in an effort to enlist the co-operation of the carriers on various plans proposed by his organization, which are still under study by committees of the Association of American Railroads, and had several vacancies to fill in his organization, because of the retirement of J. R. Turney, director of the Section of Transportation Service, O. C. Castle, director of the Car Pooling Section, M. M. Caskie, southern regional traffic assistant, and Walter Bockstahler and E. M. Johnson, of the Section of Transportation Service.

The resolution continuing the act in effect had been opposed by the Association of American Railroads but was put through Congress with comparatively little effort, under the insistence of the railroad labor organizations that desired continuance of the restrictions in the law against reduction in employment in connection with co-ordination projects and at the request of President Roosevelt because the legislative program recommended by Mr. Eastman has not yet been enacted.

Most of the Representatives who spoke on the resolution indicated that they had little understanding as to what the co-ordinator had done or proposed to do but were interested in passing the resolution because labor wanted it and because of the restriction against reduction in employment. Representative Reece, of Tennessee, objected to the section requiring the railroads to pay the assessment, saying that "it was felt that the railroads should not be called upon to continue to bear the burden of administering this act if it is continued," and that "it was unfair to call upon the railroads alone of all transportation agencies involved to bear the entire expense." Chairman Rayburn said he did not himself vote for the amendment but that there was some doubt in the minds of a number of members of the committee as to whether the railroads could be made to pay the \$2 a mile assess-

ment if they resisted. Representative Harlan, of Ohio, also took the position that the expense of the office should be provided from government funds.

During the discussion Chairman Rayburn said that he expected to pass through the committee and through the House a bill for the regulation of buses and trucks but that whether it will be exactly like the Wheeler bill passed by the Senate "is another matter."

In an address before the National Association of Credit Men at Pittsburgh on June 20, Mr. Eastman said that now that the President and Congress have elected that he shall carry on for another year he would do so "to the best of my ability, with malice toward none and with charity for all, including the railroad executives," although they had expressed the hope that he might be given "an opportunity for a well-deserved rest." Discussing the labor restrictions in the act he said that his staff had proposed a system of dismissal compensation, to take care of employees displaced by economy projects, but that it had been opposed both by labor and by the railroads. Therefore, the alternatives presented by the directly interested parties, he said, "were, on the one hand, no protection at all and, on the other, the drastic protection contained in the emergency act, and as between these alternatives, the Congress and the President have, quite naturally, I think, chosen the latter for an additional year." Nevertheless, he added, "this matter is still capable of wise and statesmanlike handling on both sides. The railroads may take it to the courts, but if they do, they will, in my humble judgment, make a serious mistake. They may perhaps find the law with them—not being a constitutional lawyer I leave that question to others; but they will not find the principles of inherent justice and equity with them, and a long-headed man will give some thought to that phase of the matter."

## Railroads And Shippers Oppose Train-Limit Bill

WASHINGTON, D. C.

HEARINGS before a sub-committee of the Senate committee on interstate commerce on the series of bills proposed by the railroad labor organizations were continued this week on the train-limit bill and on Wednesday consideration was begun of the full-crew bill.

G. H. Warfel, assistant to the executive vice-president of the Union Pacific, gave the committee a detailed analysis of the railroad safety record for the ten-year period, 1923-1933, showing not only the steady reduction in the number of casualties to railroad employees and trainmen, while the length of freight trains has been increasing about 15 per cent and the average speed about 41 per cent, but also that the very type of casualties alleged by proponents of the bill to be caused by long trains has actually decreased about two-thirds in ten years. He said that whatever methods tend to move the volume of traffic on a railroad in the least number of trains, at the best average speed, with the fewest interruptions and delays, assures the safest operation for the railroad employees and passengers, as well as the best service for the public. "I believe," he added, "that any legislation arbitrarily limiting the length of trains to a number of cars less than have been found safe and practicable by experienced railroad management, will not reduce the casualties to any class of railroad employees,

but on the contrary will greatly increase them, as well as increasing the grade crossing accidents and casualties. If the proposed train-limit legislation had any compensating feature, so that by cutting down the length of the longer trains on the one hand there would be any way for the management to lengthen out the short trains proportionately on the other, and thus avoid having to run more train units, the proposed legislation would be less hazardous, but obviously that cannot be done. The demands of shippers, and the pressure of competitive rivalry, necessitate running a great majority of trains of far less than the maximum length found most efficient. There are only certain kinds of traffic which can be run in the longer units. Any arbitrary legislative fixing of train lengths below the maximum found most efficient by practical experience is certain to defeat the very purpose of safety which is advanced as the reason for requesting this legislation." Mr. Warfel also pointed out that the number of people killed and injured in grade crossing accidents varies almost directly with the number of train-miles run per year and that "if the railroads have to run 115,000,000 additional and unnecessary train-miles in a year to move the volume of business they had in 1934, it is practically certain that this would result in between 650 and 700 more crossing accidents."

#### Dr. Parmelee Testifies

Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, testified that an enforced and arbitrary reduction in length of freight trains at this time would not only render valueless a considerable portion of the capital investment of more than seven and one-half billions of dollars since 1923, but would require additional investment on the part of the railways to accommodate their operations to changed conditions. It would necessitate changes in locomotive types and an increase in the number of locomotives, corresponding to the increased number of trains required to handle a given amount of traffic. The increased number of locomotives would in turn make necessary a remodeling of locomotive terminal facilities, to provide additional stalls in roundhouses, more track room in yards, and additional or modified repair facilities. Additional yard tracks, sidings, switches, and signal apparatus would also be required, approximately in the ratio indicated by the increase in number of trains. He continued:

Most important of all considerations, many of the improved factors of efficiency in railway operation would be nullified or reduced.

I submit a statistical table which shows how the cost of operations per 1,000 ton-miles has declined since 1920. The reduction from 1920 to 1933 was 39.2 per cent, and from 1922 to 1933 was 31.8 per cent. The corresponding averages for 1934 are not yet available. These reduced costs to a considerable extent resulted from the increased number of cars, and from the correspondingly increased number of tons of load per freight train. This downward trend in operating costs would be definitely checked by any arbitrary limitation on train lengths. A considerable part of these savings from operation have been passed on to the shipping public, as is evidenced by a decline in average revenue per ton-mile, from 1.177 cents per ton-mile in 1922 to 0.978 cent in 1934, a reduction of 16.9 per cent.

A survey of freight, mixed and work train operation of Class I carriers during the four months of January, April, July, and October, 1934, reveals that approximately 500,000 trains of more than 57 cars in length were run during those months. Raised to an annual basis, Class I railways operated approximately 1,500,000 trains of more than 57 cars in length during the year 1934. These 1,500,000 trains varied from one car to more than one hundred cars over the proposed half-mile limit. On the average, the 'excess' over the proposed limit was about 25 cars per train.

Application of the bill's provisions to 1934 operations would  
(Continued on page 987)

## Hearings on Repeal of Long-And-Short-Haul Clause

WASHINGTON, D. C.

TESTIMONY before a sub-committee of the House committee on interstate and foreign commerce in support of the Pettengill bill, to repeal the long-and-short-haul clause of the fourth section of the interstate commerce act, was concluded on June 13 after 23 representatives of the railroads, seven representatives of the railroad labor organizations, and 15 representatives of the shippers had testified in favor of the bill. In addition a large number of communications from various shippers' organizations in support of the repeal of the long-and-short-haul clause had been filed with the committee. Testimony in opposition to the bill was begun on June 17 by Johnston B. Campbell, a former member of the Interstate Commerce Commission.

In addition to the testimony of George M. Harrison, J. A. Farquharson and Harry See, representing railroad labor, which was reported in last week's issue, similar statements in favor of the bill were given by Arthur J. Lovell, W. D. Johnson and John T. Corbett, national legislative representatives of the Brotherhood of Locomotive Firemen and Enginemen, the Order of Railway Conductors, and the Brotherhood of Locomotive Engineers, and by W. O. Pell, a Southern Pacific engineman.

C. A. Miller, general counsel of the American Short Line Railroad Association, also appeared in support of the bill.

The opening statement on behalf of shippers in favor of the bill was given by J. P. Haynes, executive vice-president of the Chicago Association of Commerce, appearing as chairman of the fourth section committee of the National Industrial Traffic League, which he stated was the original sponsor of the Pettengill bill. Mr. Haynes said in part:

We are here in the capacity of shippers and will address the committee from the viewpoint of shippers who use not only the railroads but all available transportation agencies. Our statements will be limited to presentation of facts showing how the long-and-short-haul clause as it now reads and as it is now administered, places an undue burden upon the shipping public and commerce generally.

If the provisions of section 4 are not to be applied to other forms of transportation and, in my opinion, they cannot be so applied, then why should we handicap the rail carriers when such rules are not necessary to prevent unjust discrimination or undue preference and prejudice? The principle of regulation should be the protection of the public against discrimination and extortion and requiring the most efficient service at the lowest competitive cost. It should not attempt to "run the business" of transportation.

In nearly every freight rate adjustment the long-and-short-haul provisions of the law are now injected in one form or another, and the railroads are compelled to apply to the Interstate Commerce Commission for relief from its provisions before they can place adjusted rates in effect. The tremendous and needless expense incurred by the government, the railroads and the shippers in handling these applications amounts to many millions of dollars which we, as shippers, are called upon to pay, either in the form of freight rates, taxes, or our own expenses.

The long-and-short-haul regulations are more serious in their adverse effects, because they have had the result of erecting, in effect, a wall around the industries located in the vast interior of the United States beyond which they are unable to trade, shifting and limiting the sources of production to points located adjacent to the seaboard or in foreign countries. It is eliminating industry in the interior, requiring such industries as

(Continued on page 988)



# Motor Transport Section

Passenger Motor Transport Series

Article No. 2

Taos Pueblo, One of the Features of the Indian Detours



## Indian Detours Attract Passengers

Trips arranged by the Santa Fe in connection with Hunter Clarkson, Inc.  
and Harvey, Inc., prove successful

**A**LTHOUGH the Atchison, Topeka & Santa Fe has such an outstanding attraction as the Grand Canyon immediately accessible on its rails, its executives have not hesitated to take advantage of still further attractions available by motor transport. Lying adjacent to its lines in New Mexico and Arizona is a vast empire of scenic, historical and archaeological interest. Until the Indian Detours began operations, this territory was inaccessible except to expensively equipped scientific parties, but it now can be traversed from end to end comfortably, conveniently and luxuriously.

This was brought about by the formation, in 1927, of a company now known as Hunter Clarkson, Inc., to provide safe, convenient motor transport to the various points of interest. This company works closely with the Santa Fe in getting the passengers into the Indian country, and with Harvey, Inc., for feeding and lodging them after their arrival.

The Santa Fe advertising department, in conjunction with Hunter Clarkson, Inc., has conducted a widespread and effective campaign to bring the Indian Detours to public attention, and the project, which was successful from its inception, has weathered the depression in excellent condition.

The Indian Detours provide an unusually complete

motor transport service in which the company has taken over completely the transportation of rail passengers from Lamy, N. M., on the Santa Fe main line, to the city of Santa Fe which is situated on a branch line. This year, too, the company has provided express pick-up and delivery service at Santa Fe, for transportation to Lamy and transfer to main-line trains there. As a result of this train replacement service, the A. T. & S. F. branch line between Lamy and Santa Fe, 18 miles, is now operated for heavy freight service only.

The Indian Detours offer a wide variety of services. These range from a 40-min. detour to tours of months' duration. The short detour enables passengers to leave westbound trains at Albuquerque, N. M., for a 20-min. drive, and a short inspection of Indian pueblos and then to board the same train at Isleta, N. M., for continuation of the rail journey. The same detour, in the reverse direction, is provided for eastbound rail passengers. Farther west, in Arizona, a similar detour, taking 1 hr. 20 min., is provided through the Petrified Forest area.

Longer standard tours are provided in the one, two and three-day Indian detours, which include motor transportation to points of interest and lodging at the La Fonda, a new Harvey hotel in Santa Fe. These





Above—Indian Detour Car Enroute to Taos

time basis, thus providing for fluctuations in traffic. These couriers are carefully selected from women of standing in Santa Fe. Before being sent out, they are specially trained at the school of archaeological research of the Rockefeller Foundation at Santa Fe, and are thoroughly familiar with all details regarding the country traversed and its archaeological and historical interest.

To provide for travelers who wish themselves to drive through the New Mexico wonderland, but who do not wish to make the long and arduous trip from the East by auto, Hunter Clarkson, Inc., has also provided a drive-yourself service, which is quite popular.

#### Equipment

When the Indian Detours service was begun, nine years ago, all passengers were handled in motor coaches. However, because mountain roads require an unusual amount of low-gear driving when coaches were used, a fleet of Cadillac seven-passenger sedans was purchased and placed in service in 1929. This also provided for the more flexible operation which became necessary as the scope of the tours was broadened.

Coaches are still used between Lamy and Santa Fe, for larger parties visiting the nearby Puye Canyon, and



Right—The LaFonda Hotel at Santa Fe, Where the Tours Begin

comprise tours to the unique Indian pueblos in the territory adjacent to Santa Fe, including a visit to the famous town of Taos, 75 miles north. Indian detour buses meet all trains at Lamy, and the schedules of these detours are co-ordinated with the train schedules so that a passenger may get off any train and start on any of the detours without waiting. Two special circle cruises are also provided to Carlsbad Caverns, one of three and the other of four days' duration.

Other standard trips include the Meteor Mountain detour from Winslow, Ariz., and the Mesa Verde detour from Gallup, N. M. As with the other detours, close rail connections are provided in each case. In addition, special daily rates are provided for detours of indefinite duration, the itinerary depending upon the wish of the passenger. Special organized party rates are also available for 10 or more persons, by either motor coach or limousine.

A feature of these tours is the provision of a courier with each car. From 20 to 30 of these couriers are normally employed, and, since the operation was begun, an unusually efficient staff of young women has been built up, many of whom are willing to serve on a part-

for special parties requesting this type of transportation. Otherwise, all of the service is protected by limousines.

The equipment consists of 8 White and General Motors coaches and 25 Cadillac seven-passenger sedans. A fleet of Cadillac, Pontiac and LaSalle automobiles is also maintained for the drive-yourself service. A modern garage has been built at Santa Fe for the servicing of this equipment, which is all checked at frequent intervals so that, despite the rigors of mountain driving and the relatively small mileage of hard-surface roads, the equipment is kept in excellent condition.

An excellent safety record has been established in the nine years of operation by the careful selection and training of drivers, some of whom have 300,000 miles to their credit without an accident of any kind. Before being permitted to take out passengers, the drivers are given a thorough course in safety, after which they are required to pass rigorous driving tests. Their performance is also carefully supervised after they are put to work.

As stated previously, the Indian Detours service is widely advertised. In addition, descriptive tariff-cir-

(Continued on page 987)

# Oldest Rail-Highway Co-ordination Is Still Successful

Spokane, Portland & Seattle freight and passenger motor transport operations hold business despite depression

BY inaugurating a bus line between Portland, Ore., and Rainier, 48 miles, in August, 1924, the Spokane, Portland & Seattle became the first railway in this country to engage in motor transport. This enterprise, which has since been expanded considerably, as far as passenger transportation is concerned, and added to by a pick-up and delivery service for freight, has preserved its revenues throughout. This was accomplished despite the depression, which has been particularly severe in the territory served, since it has been complicated by the cutting away of most of the timber on which the district previously depended for its livelihood.

The S. P. & S., including its Oregon Electric and Oregon Trunk subsidiaries, operates 952 miles of railway, the main line extending between Spokane, Wash., and Portland, Ore., with an extension along the south bank of the Columbia river from Portland to Astoria, 100 miles, and thence to Seaside on the Pacific Ocean, 18 miles beyond Astoria. It was on this extension that highway competition began to be felt at a very early date.

## Competition Increases

During the World War, a military camp was established at Fort Stevens, Ore., near Astoria, and auto taxis were installed to haul the soldiers from Astoria to the camp. When this purpose had been served, the operators began extending their services to parallel the S. P. & S. between Astoria and Seaside, also between Portland and St. Helens, and upon the completion of the state highway, consolidated and commenced operations between Portland and Seaside. By 1924, this competition had reached alarming proportions. After a study of the situation, the railway officers formed the Spokane, Portland & Seattle Transportation Company, in an effort to meet this competition.

Bus service was begun between Portland and Rainier in August, 1924, as an experiment in both train replacement and meeting competition. It was soon realized that the operation was on too restricted a scale and within a few months the route was extended to Astoria, 105 miles from Portland by highway. Shortly afterwards, the service was extended to Seaside, a resort 22 miles beyond Astoria. The service has since been kept up to such an extent and has proved so satisfactory that there has been only spasmodic and short-lived competition since May, 1925.

Seven trips between Portland and St. Helens, and three beyond are available in each direction daily. Two trains are still operated in each direction daily, and S. P. & S. tickets between Portland and Seaside are interchangeable, the fares of each line being the same, and may be used either on the train or the bus. The service is protected by 13 White, Fageol and Will buses.

## Freight Motor Transport

Encouraged by the success of its passenger motor transport, the S. P. & S. was one of the first railways

to provide pick-up and delivery service. The Northwest Freight Transport Company, a freight express subsidiary, was formed in the fall of 1930 for this purpose. Despite the fact that the entire history of the transport company is confined to the depression period, increases in merchandise traffic handled have been shown every year, as compared with 1929, when collection and delivery service was not provided.

As in the case of the passenger transport subsidiary, the Northwest Freight Transport Company confines its service to intrastate shipments in Oregon. The scope of its operations extends over the line between Portland and Astoria, 126 miles, and along the lines of the Oregon Electric between Portland and Eugene, 122 miles. This territory is entirely within the Portland jobbing district and there is no competition with this city from a jobbing standpoint. Accordingly, pick-up service is provided in Portland for shipments destined to all stations, and delivery service at 16 of the larger stations in the territory served.

Insofar as possible, the transport company has made every effort to preserve the long-standing relationships between shippers and draymen at Portland. Many of the Portland drayage concerns are in the warehouse business as well, and it was not felt that it would result in efficient handling if one drayman went to a competitor's warehouse to pick up freight which the other was quite competent and well equipped to handle. Accordingly, the contracts for drayage in Portland have not been confined to any one company, all the important



S. P. & S. Bus in the Oregon Timber Country



draymen being under contract with the transport company.

### Features of the Service

In addition to collection and delivery, the transport company operates a station-to-station trucking service between Astoria and Seaside, 25 miles, in order to provide the latter town, the largest resort in the Northwest, with faster freight service.

The main object in the formation of the subsidiary was to meet highway competition, but it has to meet, as well the completely unregulated water competition between Portland and stations along the Columbia river.

The transport company functions also in soliciting for and handling details of the interstate pick-up and delivery service operated from Portland to Wishram via the S. P. & S., and along the line of the Oregon Trunk, a S. P. & S. subsidiary terminating at Bend, Ore. Its experience is also being used by the S. P. & S. in providing its share of the pick-up and delivery service inaugurated by all lines between Spokane, Wash., and the Northwest ports of Portland, Tacoma and Seattle.

### Organization and Solicitation

The Northwest Freight Transport Company involves practically no investment on the part of the S. P. & S. Its accounts are kept separately and it is charged with each item of expense it incurs. It makes its own rates and has its own freight solicitors for merchandise traffic. All solicitors are under its jurisdiction, so far as l.c.l. freight is concerned. This intensive solicitation of merchandise traffic, plus the service rendered, keeps the solicitors in regular contact with a number of small shippers, who, otherwise, would be perhaps visited only occasionally by traffic representatives, but who control, in the aggregate, considerable carload traffic.

### Carload Traffic

The Northwest Freight Transport Company has helped to get carload traffic back to the rails in other ways. For example, there is a large movement of canned goods from its territory to ships at the Portland docks for intercoastal and export movement. This traffic was formerly routed via its parent rail line, but, for the past few years, the entire movement had been handled by trucks because of lower rates and the direct delivery provided at the docks.

The transport company published rates some time ago

covering this movement, including delivery service to the ships at Portland, and as a result, the traffic is again moving by rail. The rates necessary to hold it against highway competition are low, but cost figures, including the rail haul and the delivery charges, show that it is being handled at a fair profit, apart from the consideration that there are fewer trucks entering Portland, anxious to secure traffic for the return trip at almost any rates to avoid the empty backhaul. Similar traffic recovery plans have been successful on movements of such commodities as seed, hops, barreled cherries, wool and grain.

## Great Northern Provides Glacier Park Detour

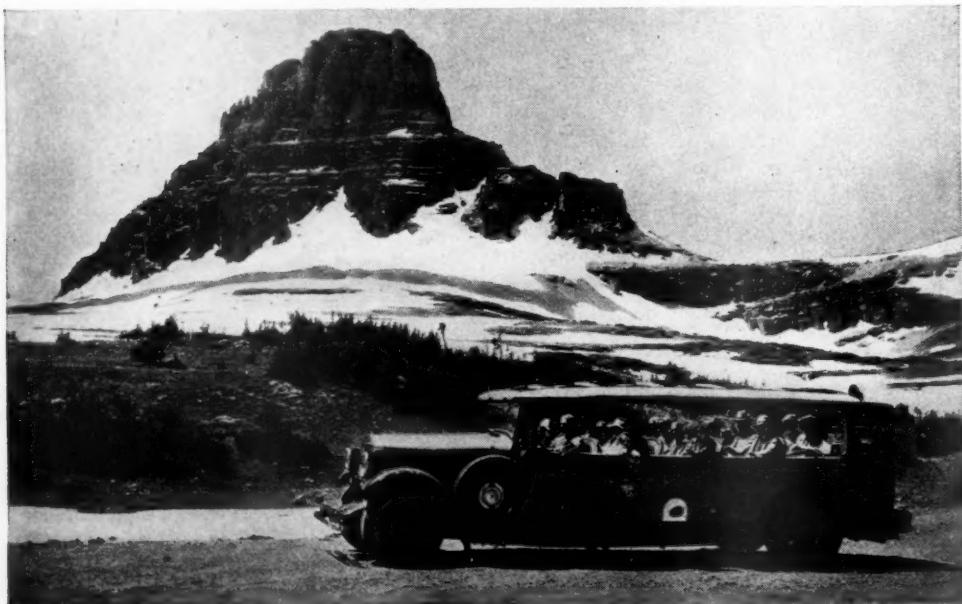
**T**AKING advantage of the new and spectacular Going-to-the-Sun highway recently opened through Glacier National Park, the Great Northern has arranged for an automobile ride through the Park, known as the Logan Pass Detour, in connection with its transcontinental train, the Empire Builder.

Beginning June 15, passengers on this train may take the one-day detour, either eastbound or westbound. In connection with the Glacier Park Transport Company and the numerous hotels in the park, passengers may leave the train shortly before noon, ride through the park and continue their journey on the Empire Builder the following day at noon. The detour is between Glacier Park station and Belton, Mont., and features a night in the high Rockies and a crossing of the Continental Divide over Logan Pass.

### Extended Tours Also Available

In addition to the new detour, the Glacier Park Transport Company operates bus service for Great Northern passengers making longer stays in the park, its buses and cars meeting all trains. Its service ranges from short trips to extended tours, and sufficient standby equipment is maintained at all times during the season to take care of large special parties.

The transport company operates 80 White buses, in addition to a large fleet of Cadillac and LaSalle touring cars.



Approaching the Summit of the  
Continental Divide in Glacier  
National Park

Continued on next left-hand page



# THE VITAL 6%



Locomotives represent only 6% of the total investment in Railway property. ■ Make the other 94% more productive by the use of modern designs of locomotives and increase the net return on the entire investment.



## Railroads and Shippers Oppose Train-Limit Bill

(Continued from page 982)

have meant the redistribution into additional trains of 37,500,000 cars (1,500,000 trains times 25 'excess' cars each). Under ideal conditions, these 37,500,000 cars could conceivably be handled in 658,000 trains of 57 cars each in length. Such ideal conditions do not exist, however. Assuming then that the 37,500,000 'excess' cars were redistributed into trains averaging 40 cars in length, a total of 937,500 additional trains would have been required in 1934. Each of those trains would cover a distance of 109.4 miles, or an aggregate of 102,562,500 train-miles. At an average 'out-of-pocket' cost of \$1.13 per freight train-mile, the added annual cost of the proposed train length limitation in the freight service alone would be not less than \$115,000,000, based on the 1934 volume of business. As the volume of freight traffic increases over the low level of business in 1934, there will be a corresponding increase in this cost.

In computing "out-of-pocket" cost per freight train-mile, only those items of expense directly affected by the number of trains run have been included. These items are: Wages of engine-men and trainmen, locomotive repairs and enginehouse expenses, fuel, water, lubricants and other supplies for locomotives. A 25 per cent allowance for possible savings in fuel consumption per train-mile was made.

No allowance was made for the annual cost of the increased investment in locomotives that would be required to handle the additional trains, nor was allowance made for any increase in items of operating expense other than those directly affected by the number of trains run. A conservative estimate of twenty-five million dollars annually, for such increased expenses, brings the total cost of the proposed bill for the freight service alone to approximately \$140,000,000 annually, based on current operations.

Further, no allowance was made for the fact that many of the physical improvements of recent years would be operated at much less than their proper levels of efficiency. For example, a large locomotive designed to haul 100 cars would be used for hauling only from 40 to 60 cars, and there would be a waste in utilization. To put wastes of this kind into dollars and cents is almost impossible, but they would aggregate many millions of dollars per year.

Increased operating cost would also accrue in the passenger service from the proposed limitation of passenger trains to a maximum of 14 cars per train. A survey of passenger train operations coming within this definition reveals that during the months of January, April, July and October, 1934, approximately 30,200 trains of more than 14 cars were operated by Class I carriers. Raised to an annual basis, approximately 90,600 trains of more than 14 cars were operated in the passenger service in the year 1934. These trains traveled an average distance of 152.4 miles, or a total of 13,807,000 train-miles. To maintain their present scheduled service, and come within the limitation of the proposed bill, these 13,807,000 train-miles would very nearly have to be duplicated. Even allowing for a 20 per cent margin to be absorbed by possible rearrangement of schedules and operating practices, approximately 11,000,000 additional passenger train-miles would be required. At an average 'out-of-pocket' cost of 57 cents per passenger train-mile, the first cost would be \$6,270,000. Adding to this the indirect effect on other items of operating expense, such as those I have already enumerated in my discussion of additional costs in the freight service, the aggregate cost in the passenger service would be not less than \$10,000,000 annually.

Summarizing both freight and passenger service, a careful and reasonable calculation of the increased annual cost of this bill, based on the operations of 1934, would be \$150,000,000. Based on the much higher levels of traffic and train-miles handled in the year 1929, the cost of the bill would run from \$250,000,000 to \$300,000,000. As the operations of the railways return to more nearly normal levels, the annual cost of this bill, if enacted, would rise proportionately above the figure of \$150,000,000 calculated for 1934.

Charles R. Seal, traffic director of the Baltimore Association of Commerce, who also appeared for the Na-

tional Industrial Traffic League as chairman of its legislative committee, and the Shippers' Committee for Trunk Line Territory, said "the conclusion seems inescapable that the railroads cannot absorb the extra expense that would be created by the passage of this bill, amounting to about \$150,000,000 annually on the basis of the 1934 operations, not to mention the much greater total expense that would attend the passage of the several other bills which are the subject of this series of hearings, and which would amount in the aggregate to almost \$700,000,000 a year or more than 20 per cent of the total transportation receipts of the railroads in 1934." He continued:

I think it is obvious to anyone familiar with the transportation problems of today that there is no way by which the roads can provide any such additional amount of revenue or any appreciable part of it. The traffic will not stand it, because the cost of distribution of goods is already too great, and if the traffic could stand it the competition encountered from other agencies would not permit any such increase in the charges of the railroads, which no longer have a monopoly of transportation. Faced with this impossibility of raising any great amount of additional revenue it is not pleasant to think about what would happen to the railroad transportation system of this country if this burden of expense were forced upon it. There would undoubtedly be a break-down in transportation efficiency, and abandonments of branch lines which provide the only railroad service for many communities. Even then the shippers and other taxpayers would no doubt have to go into their pockets to maintain this essential industry. It seems to me that the result would be to so greatly impair the ability of the railroads to employ labor and pay it adequate wages as to be to the disadvantage of railroad labor.

As to this particular bill, it would destroy the value and use of increases which have been made in locomotive power, designed to effect economies in operation and provide improved service. Railroad service has greatly improved since the war, as present-day facilities and operating methods have been introduced, and is now regarded as best in the history of transportation. The present standards of service could not be maintained under the burden of expense that would be imposed upon the railroads by this legislation. Truck competition turns in large part on the price at which the shipper can obtain service, and the railroads would be handicapped in meeting this competition by legislation which would arbitrarily increase their operating costs. The railroads would suffer much more than the actual costs of the legislation itself, being prevented thereby from maintaining rates that would meet truck and other competition, they would suffer further diversions of traffic to their competitors, with a corresponding loss of revenue. They could not, of course, continue the efficient service which they now provide, which would be another competitive handicap.

## Indian Detours Attract Passengers

(Continued from page 984)

culars are widely disseminated, not only among A. T. & S. F. representatives but among all passenger and ticket agents as well. The territory served is unusually rich in possibilities for new tours, and an appreciable proportion of the present business consists of "repeat orders;" travelers who have been passengers on the Indian Detours before, and who are attracted West again by the provision of new services to places they had not previously explored.

A feature of this undertaking is that it is creating a new travel market, as well as attracting passengers to the Santa Fe who would otherwise use competing transportation agencies. In other words, no inconsiderable percentage of the passengers have been attracted to the West by the Indian Detours, using the rail lines enroute, who would not, otherwise, have gone West at all.

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## THE LOCOMOTIVE BOOSTER



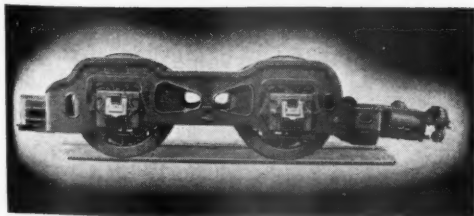
### MAKES LUXURIOUS TRAINS COMFORTABLE TRAINS

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To safeguard the advantages of, and investments in, air conditioning The Locomotive Booster is needed to start the train smoothly and to accelerate quickly to road speeds.

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# FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK

CHICAGO

MONTREAL



## Hearings on Repeal of Long-And-Short-Haul Clause

(Continued from page 982)

remain and the producers of farm products to bear the burden of supporting the railroad properties, including the vast unused portions of such properties, through the payment of higher freight rates on the traffic which they still move in connection with such railroads.

In conclusion Mr. Haynes said:

We believe the conclusion is inescapable that repeal of the long-and-short-haul clause of the fourth section would be in the public interest because:

1. As construed by the Interstate Commerce Commission, particularly since 1920, it is in effect an absolute prohibition against a railroad charging less for a longer than for a shorter haul to meet competitive conditions although such rates conform to other sections of the interstate commerce act.
2. It places a definite burden upon commerce without any compensatory advantages.
3. It prevents and suppresses competition not only between transportation agencies but between manufacturers and other shippers, as well, and thus tends to promote monopoly.
4. It is out of harmony and inconsistent with the letter and spirit of the interstate commerce act as a whole, the fundamental purposes of which have been recognized by both the commission and the courts to be to promote and encourage the free movement of commerce and competition between shippers as well as between transportation agencies by prohibiting inequality, discrimination and favoritism for the purpose of insuring equality of opportunity.
5. It places in the hands of the Interstate Commerce Commission the power to dictate where business may be done; the sections of the country between which commerce may move.
6. It deprives the shipping public of the benefits of private initiative in railroad management in furnishing efficient, economical and expeditious transportation service as well as rates necessary to meet the needs of commerce.
7. It results in centralization of industry at points served by other transportation agencies not subject to its provisions.
8. It disrupts long standing, reasonable, non-discriminatory rate adjustments and deprives the shipping public either absolutely or for long periods of time of reasonable non-discriminatory rates necessary to meet the needs of commerce because of the necessity of complying with its needless and arbitrary provisions.

Mr. Haynes was followed by representatives of rail shipping interests from Boston to Colorado. Starting with the declaration of John B. Keeler, assistant traffic manager of the Koppers Company, Pittsburgh, who appeared for the Pittsburgh Chamber of Commerce and the Pittsburgh Traffic Club, that the long-and-short-haul clause is a constant influence toward development of a distance basis of freight rate adjustment that will disrupt the industrial distribution of the entire country, the hearing continued with corresponding attacks by James H. McCann of Boston, transportation manager of the Associated Industries of Massachusetts; S. O. Lampman of Marshalltown, Iowa, representing the Iowa-Nebraska canners; G. H. Shafer, of the Illinois Commerce Commission, and Ward Wire, traffic manager of the Colorado Fuel & Iron Company, Denver.

"We submit that only by complete repeal of the long-and-short-haul clause will the rail lines be afforded that equality in making competitive rates, as compared with their water and highway competitors, which the changed conditions warrant and the public interest requires," declared Mr. McCann.

Mr. Lampman said that he also spoke for 14 jobbing houses in Iowa, Minnesota, Missouri and Kansas and for 8 canneries in Iowa and one in Indiana. He complained vigorously of the mileage scales of rates that are being developed in the interior as a result of the administration of the long-and-short-haul clause.

The tonnage of its products sold on the Pacific Coast by the Colorado Fuel & Iron Company has declined from more than 250,000 tons in the year preceding the withdrawal of relief from the long-and-short-haul rule to an average of 87,078 in the last five-year period, Ward Wire, traffic manager of that company, stated. Continuing he said:

The history of the company is so replete with illustrations of its advance and decline during periods of favorable and unfavorable freight rate adjustments, that it may fairly be said the freight rate structure is the controlling factor in its fight for existence. In the distribution of our finished products we cannot rely entirely on the large, sparsely settled area, which, although developing, does not require sufficient steel products to enable us to profitably conduct our operations. We must, therefore, have access to the larger consuming areas, the Pacific Coast and lower Texas markets, where the consumption of steel products is extensive. Water competition through the Panama canal to Pacific Coast points and via the Gulf to Texas ports has practically closed those markets to us in so far as any volume of tonnage is concerned.

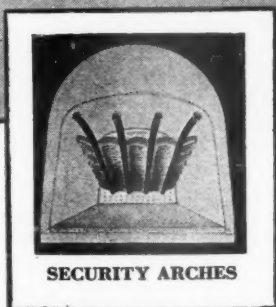
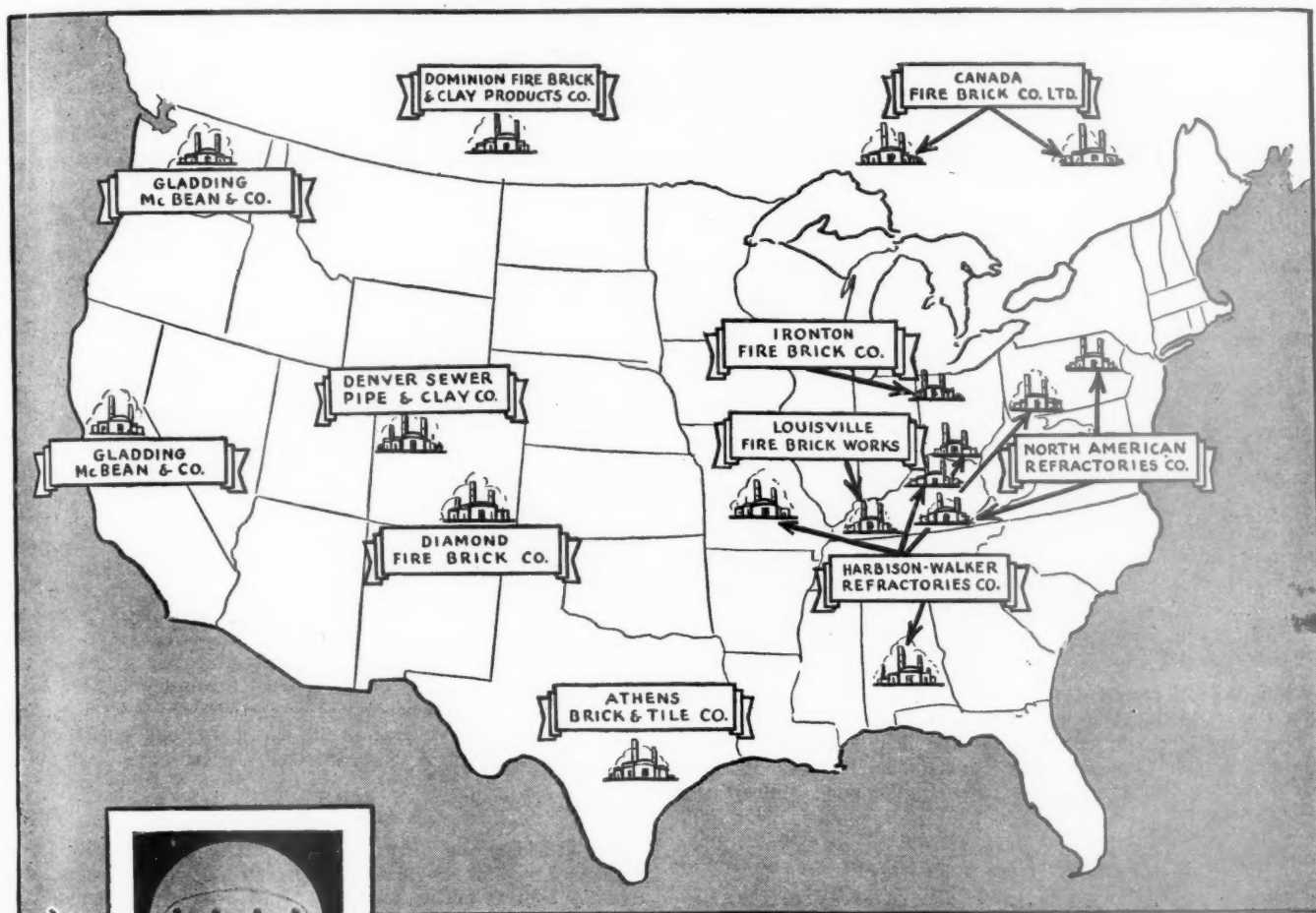
To illustrate this situation—in the eight so-called intermountain states of Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Arizona and Nevada, where due to our location we naturally can expect to place our product, the latest census figures show a total population of only 3,765,000 persons. California alone has a population of 6,062,000, while the three Pacific Coast states show a combined population of 8,635,000. Texas has a population of 6,023,000—the territory, however, in this state that we can service is in the west and Panhandle, where the density of population is light. Thus it will be observed that while we are located geographically to serve this entire western section, obstacles have been placed before us that have been insurmountable, not only for us, but by reason of restrictive legislation, the rail carriers interested are unable to render assistance.

Administration of the long-and-short-haul clause has cost the federal government, shippers, and the railroads millions of dollars without resultant benefits to any one, F. C. Hillyer, of Jacksonville, testified. "The most surprising thing about this enormous expense," he added, "is that not one cent of it has been of any use to anyone." Mr. Hillyer, who was an attorney-examiner of the Interstate Commerce Commission for eleven years, appeared as the representative of Florida shipper organizations, including the Jacksonville Chamber of Commerce, Traffic Bureau and Port Bureau, the Miami Rate and Traffic Board and the Southern Cypress Manufacturers Association. He was followed by J. H. Donnell, representing the Association of Commerce, Tampa, Fla.

Proceedings before the sub-committee took a wide territorial range, other shipper representatives appearing in support of the bill including W. J. Hammond, traffic manager of the Inland Steel Company, Chicago; H. B. Tooker of San Francisco, representing producing copper companies in Montana, Utah, Nevada, Arizona and New Mexico; Karl D. Loos, representing the California Fruit Growers Exchange and the California Fruit Exchange; L. P. Siddons, representing 40 beet sugar refineries in Colorado, Kansas, Nebraska, Iowa, Minnesota, Wyoming, Montana, Idaho, Utah and California; H. N. Proebstel, representing the West Coast Lumbermen's Association; Ivan L. Plette, Yakima Valley Traffic and Credit Association; L. C. Newlands, Oregon Portland Cement Company, and C. D. Dehne, of the Arkansas Rice Traffic Bureau.

THE LEIPZIG TRADE FAIR will be held this year from August 25 to 29 inclusive at Leipzig, Germany. It is expected that buyers from 74 countries will attend and that the newest art and industrial products of 22 producing countries, including the United States, will be on exhibition. The historic Fair which has been held without interruption for 700 years is the largest as it is the oldest in industrial exchange in the world.

## There Is A "SECURITY ARCH" Plant Near You



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SECURITY ARCHES  
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"Ready to serve" expresses in three words the standard of railroading.

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Security Arch Brick is promptly available at many points throughout the country.

This ready availability guarantees against delay.

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INCORPORATED  
*Locomotive Combustion Specialists*  
NEW YORK CHICAGO

# Odds and Ends . . .

## Ash-Trays

The laurel wreath for the most unusual ash-trays goes to the Harvey-operated Santa Fe dining cars, on which the ash-trays take the form of bronze sombreros, the shape of which makes them ideal for the purpose.

## Siderodromophobia

Perhaps you are unacquainted with the meaning of the word siderodromophobia. Well, so were we until very recently, when we discovered that it is a form of psychasthenia which afflicts its victims with a mortal dread of locomotives.

## Chimes

The Union Pacific station at Boise, Idaho, lays claim to being the only railway station in the country, and perhaps in the world, with a bell tower, and an operative set of chimes. The chimes play each time a train arrives in Boise.

## A Family Affair

Switch Engineman C. R. Hawkins, of Sweetwater, Texas, hit an automobile at a grade crossing there recently and demolished it, which is not news, *per se*. What is news, however, was that the car belonged to his wife, who was driving it. Although she was uninjured, we'll venture to say that there will be no lack of conversation in the Hawkins home for some time to come.

## Dog Ticket

In England, it appears, the railways regard the dog as being even more of man's best friend than they do here. Robert White, section foreman of the Grand Trunk Western at Drayton Plains, Mich., sends in a Southern Railway (England) dog ticket, good for transportation of one dog, accompanied by a passenger from London to any station within 10 miles, at a cost of 6 cents. Towser, it seems, rides in the same compartment as his master.

## Farthest from a Railway?

The town of Fredonia, Ariz., lays claim to being the settlement farthest from the nearest railroad in the United States; also it is the only town in Arizona north of the Grand Canyon. It is 96 miles from the nearest railway, but it can be reached, during the summer months when the snow has melted from the passes, by the buses of the Utah Parks Company, a subsidiary of the Union Pacific.

## A Real Record

CHICAGO.

TO THE EDITOR:

We have an agent by the name of C. J. Cawley who represents us at Pipestone, Minn. The railroad was built through Pipestone in November, 1879. The depot was not completed until November, 1880. Mr. Cawley was the first agent there, is still the regular agent at that point and going strong.

O. N. HARSTAD,

General Manager, Chicago, Milwaukee, St. Paul & Pacific.

## Veterans

Two groups of retired employees, which are believed to be without parallel in the records of any other company or business in the world, are disclosed in the annual report of the Pennsylvania's pension department for 1934. The first group consists of a list of 51 men carried on the pension rolls, each of whom, at the close of 1934, had attained the age of 90 years or over. The second group is composed of 49 men, each of whom had worked for the company 55 years or more at the time of his retirement. The combined age of the 90-year veterans—the "grand old men of railroading"—was 4,651 years. The dean of the corps, Joseph R. Jones, formerly supervisor of

signals, is now in his 100th year. Mr. Jones, a veteran of the Civil War, is in good health and if he passes the next anniversary of his birth he will be the third retired Pennsylvania worker to reach the century mark since the pension plan was established on January 1, 1900. He had more than 40 years' service at the time of his retirement and has been on the pension rolls over 29 years.

Of the men in the 90-year group, only one was of officer rank—James P. Orr, formerly assistant freight traffic manager at Pittsburgh, Pa. Mr. Orr, who is now 91 years old, had 48 years of service and has been retired 21 years. In point of numbers, retired enginemen lead this group, seven being of that classification. There are 6 foremen and 5 each of laborers and machinists. Twenty-three other occupations are represented. The group with 55 years or more of service is headed by James H. Schmidt, formerly traveling freight and passenger solicitor at Philadelphia, Pa. He worked 59 years before retirement and has been on the "roll of honor" nearly 18 years. The 49 men in this group rendered to the company an aggregate of 2,753 years of service prior to retiring.

## Viaduct in England, 94 Years Buried, Found Good As New

After being buried for nearly a century in the bed of the Derwent river at Balper, England, timber foundations of a viaduct constructed under the supervision of the famous English engineer George Stephenson, have been dug up as good as new. This discovery was made during the rebuilding of Swainsley viaduct, on the London Midland & Scottish main line from London to Manchester. Descending to inspect the amount of scour caused by the river, a diver found imbedded in the river bed to a depth of from 7 to 10 ft., a number of stout timber piles which, when brought to the surface, were identified by L. M. & S. engineers as the supports of the original Swainsley viaduct, constructed in 1840. When removed from the river bed the timber was reported to be as good as the day it was put in, despite its 94 years' immersion in the bed of the Derwent.

## A Good Imitation

The accompanying illustration shows a set for the new movie "Stranded." This set portrays one of the newer passenger stations with great fidelity to detail. Kay Francis, the star of the film, is at the Travelers Aid Society desk. The design represents a composite of details taken from several existing stations.

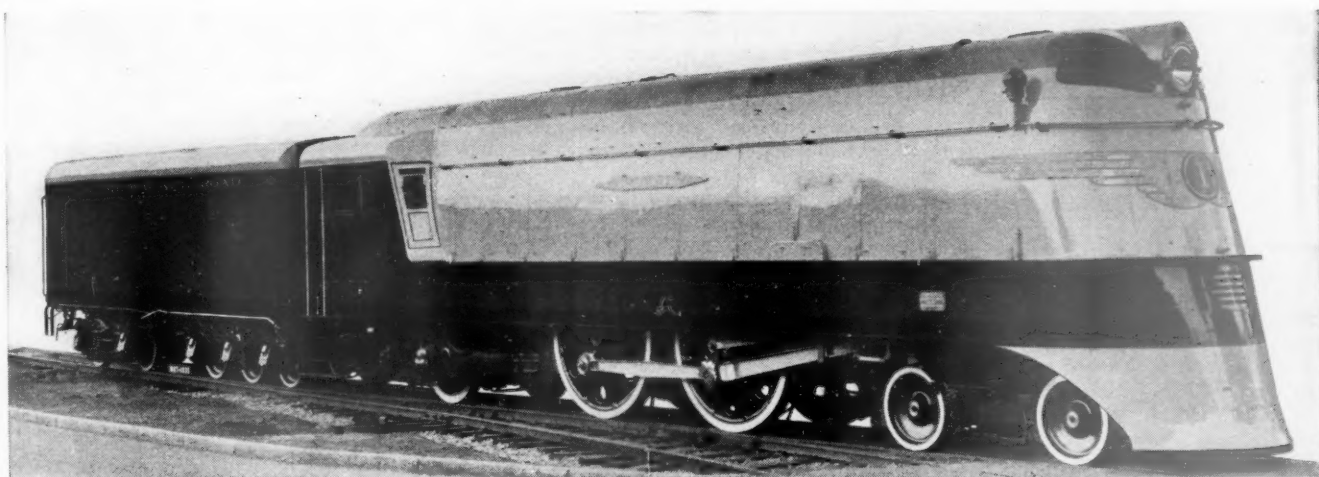


Hollywood's Simulation of a Union Station

News Department begins on next left-hand page



# SPEED



High speeds are nothing new to the steam locomotive . . . Railway files are full of records of special runs; the steam locomotive of 40 years ago exceeded, time and time again, 100 miles an hour for a few miles with light special trains . . . True, these "stunt" runs were not considered good railroading. . . However, the point is this — speeds until lately have been kept within certain limits . . . But not because of inadequate capacity for speed in the steam motive power unit . . . We can secure most easily and economically with steam all the speed that any railroad will dare use for many years to come.

AMERICAN LOCOMOTIVE COMPANY

# A&O

30 CHURCH STREET NEW YORK N.Y.

# NEWS

## Congress Considering Many Pending Transportation Bills

President Roosevelt's message to Congress in which he asserted that it was "high time" to do something in the way of transportation legislation has at least had some effect in stimulating consideration of the numerous bills pending, in addition to the passage last week of the resolution extending the co-ordinator law for another year.

The Senate committee on interstate commerce held an executive meeting on June 17 with Co-ordinator Eastman and gave some consideration to the bills he had recommended for the regulation of waterway transportation and for the reorganization of the Interstate Commerce Commission. As a result Mr. Eastman was to redraft the waterway bill, omitting some of its controversial features, for the further consideration of the committee, and Chairman Wheeler expressed the opinion that the committee might be able to act on the I. C. C. bill. The committee on June 14 had also reported favorably S. 1633, the Eastman bill to amend Section 3 of the interstate commerce act to include ports within the definition of localities in the prohibition against discrimination. A subcommittee of the House committee on interstate and foreign commerce has held a hearing on the bill. The Senate committee also reported the resolution providing for the winding-up of the affairs of the Railroad Retirement Board and the President has sent to Congress a request for an appropriation of \$35,000 for the purpose. The House judiciary committee is understood to be about to report on the bill proposed by Co-ordinator Eastman to amend the bankruptcy statute and the subcommittee of the committee on interstate and foreign commerce that has been considering the truck bill is also understood to be nearly ready to report.

On Wednesday the committee voted to report the bill as revised by Mr. Eastman, omitting from the original bill all provisions relating to private carriers and wharfers and the commodities clause, as well as the special provisions relating to foreign commerce, and substituting a new section transferring the existing regulatory functions of the Shipping Board Bureau to the Interstate Commerce Commission. Provision is also made for the exemption of contract carriers whose operations are not competitive with common carriers and for their omission from the provisions relating to security issues and mergers. These changes eliminate many controversial features of the bill and confine it mainly to provisions for regulating transportation on inland waterways, the

Great Lakes, and in intercoastal service.

The Railway Labor Executives' Association is still conducting a vigorous campaign for passage of a railroad pension bill at this session of Congress, in spite of the fact that the Administration has endeavored to postpone the issue pending further study by a special commission. Approximately half a hundred general chairmen, state legislative representatives, and other representatives of the labor organizations have been in Washington calling on members of Congress in the effort to enlist support for their program and their special legislative committee has addressed a letter to Chairman Rayburn and other members of the House committee on interstate and foreign commerce expressing dissatisfaction with the proposal in a resolution he had introduced at the request of the President for a further investigation by a commission. "Such an investigation in lieu of legislation at the present session of Congress would be wholly unsatisfactory to the railway labor organizations of the United States," they said. "There is no necessity for such an investigation," they added, requesting the committee to oppose the resolution and instead lend their best efforts to the passage of a satisfactory railway retirement insurance bill at the present session. The letter referred to the substitute bill introduced by Representative Crosser and said that, with certain changes to be suggested, they felt "absolutely certain as to the constitutionality of the measure."

The Senate, in passing the President's social security bill on June 20, adopted by a vote of 51 to 35 an amendment proposed by Senator Clark, of Missouri, to permit exemption from the provisions of the bill imposing payroll taxes for the purpose of establishing old-age pensions of companies that have in operation plans for paying retirement annuities for employees that are approved by the proposed federal board. Many of the railroad pension plans provide for larger maximum pensions than those provided in the bill.

A meeting of the Railway Labor Executives' Association was called to be held in Washington on Wednesday to consider the legislative situation.

## Edwin P. Morrow Dies

Edwin P. Morrow, governor of Kentucky from 1919 to 1923 and former member of the Railroad Labor Board and its successor, the Board of Mediation, died of a heart attack on June 15 in Frankfort, Ky. Mr. Morrow resigned from the Board of Mediation on July 1, 1934, a short time before that board was superseded by the National Mediation Board.

## Precautions Needed with Arch-Bar Trucks

W. J. Patterson, director of the Bureau of Safety, Interstate Commerce Commission, reporting on two derailments on April 4 last, both occurring on the same road but at different places, about midnight, renews the discussions and certain admonitions which have been made public in connection with other recent derailments, emphasizing especially the excessive costs incident to the continued use of arch-bar trucks in freight train service; and the potential danger to all passenger as well as freight trains.

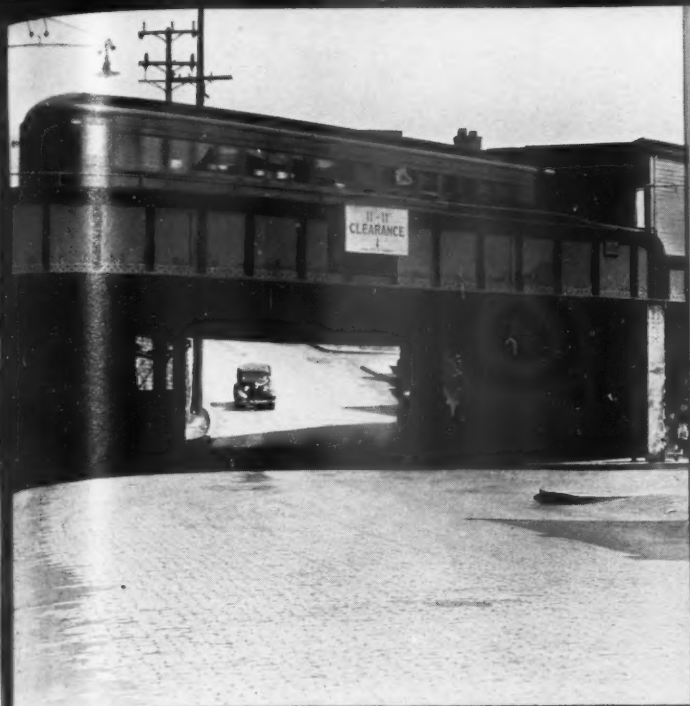
These derailments occurred on the Chicago, Rock Island & Pacific, at Ottawa, Ill., 84 miles west of Chicago, and at Tiffin, Ia., 161 miles west of Ottawa.

At Ottawa, a westbound freight, moving at good speed, was derailed and the wreckage was immediately struck by an eastbound freight; and an engineman, a fireman and a brakeman were killed; one other trainman injured. At Tiffin, an eastbound freight, derailed while running at about 40 miles an hour, did serious damage also to another freight standing on a side track; and it also demolished the station building, injuring the station agent who (off duty) was sleeping in the office.

Several pages are given to the details of the evidence, from which it appears that the arch-bar which failed at Tiffin was put in by repairers only the day before, and had traveled only 92 miles; it had not been properly fitted, leaving irregular stresses, and the blacksmith had done poor work; a bar not exactly the right size had been used, and other negligence was found.

At Ottawa, the trouble was the collapse of the side frame of an arch-bar truck. One of the box bolts was of steel and one of iron, not conforming to standard requirements; and the failure was attributed mainly to insufficient shear resistance, and reduced capacity of springs due to wear and corrosion.

The report gives statistics of the Rock Island's freight cars and of the road's experience with this type of truck, making comparisons with similar data from the Missouri Pacific, as published in connection with a derailment on that road last February (reported in the *Railway Age*, May 4, page 700). The Rock Island has 40,905 freight cars and 21.6 per cent of these have arch-bar trucks. (This percentage is much lower than that in the record of all freight cars in service on American railroads). The Rock Island reports that old cars are being dismantled and other changes are being made, but



## Next to Separation . . . Flashing Light Signals Provide the Best Highway Crossing PROTECTION

Grade separation is the only completely "fool-proof" solution of the highway crossing problem. Separation, however, of all existing crossings, or even all of the most important crossings, is economically impossible, and the public is entitled to protection at a far greater number of crossings than could possibly be so eliminated. » » » »

Past experience has shown that the automatic flashing-light highway crossing signal gives a very high degree of protection with a relatively small expenditure. Many crossings can be protected by these signals at the cost of one grade separation. » » » » » »

Complete elimination of the crossing hazard at a few crossings will not solve the problem, as a whole. It would be far better to provide protection, which would be effective in practically all cases, at 100 crossings, than to provide complete protection at two or three, at the most, and to leave the balance of the crossings unprotected. Without question, the public interest calls for the elimination of certain crossings but it also demands that the most effective protection be established to benefit the greatest number within the limits of the funds available.

1881

**Union Switch & Signal Co.**

1935

SWISSVALE, PA.

NEW YORK

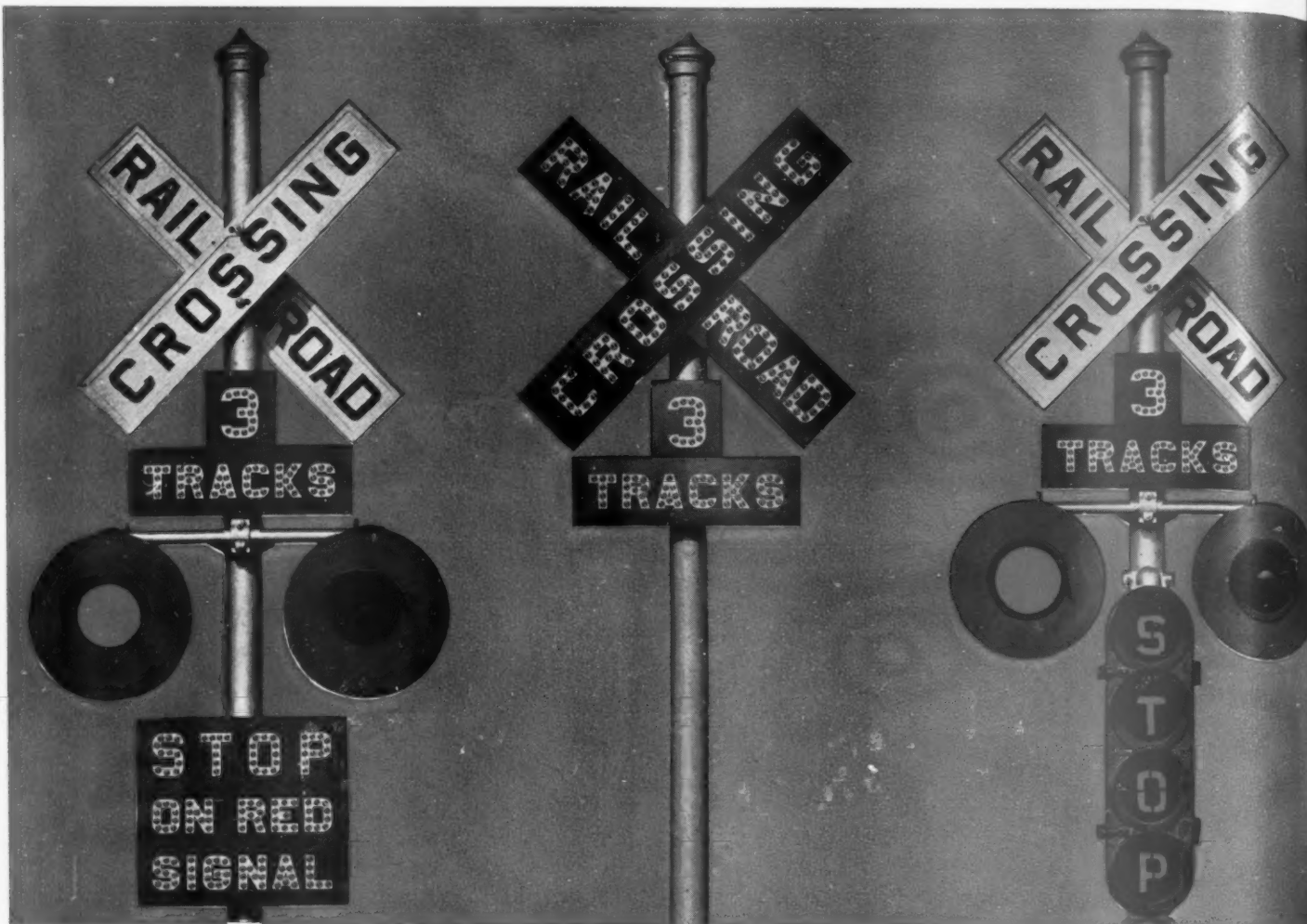
MONTREAL

CHICAGO

ST. LOUIS

SAN FRANCISCO





Flashing Light Highway Crossing Signal Assembly with 90 deg. double-face cast iron crossing sign, and reflector button auxiliary signs.

90 deg. Reflector Button Crossing Sign with auxiliary reflector button track sign. Adaptable as warning on light traffic highways, crossing railroads.

Flashing Light Highway Crossing Assembly with 90 deg. cast iron crossing sign, illuminated "STOP" sign and reflector button track sign.



Night indication to motorist is distinctive and unmistakable.



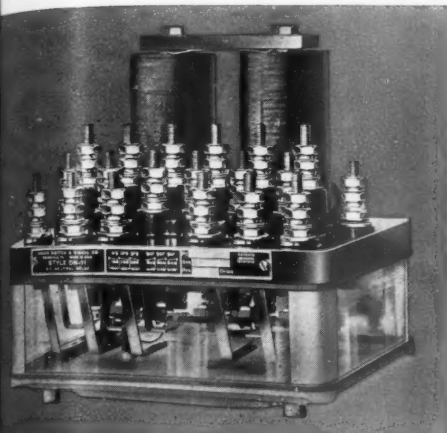
How the reflector button crossing sign appears at night.



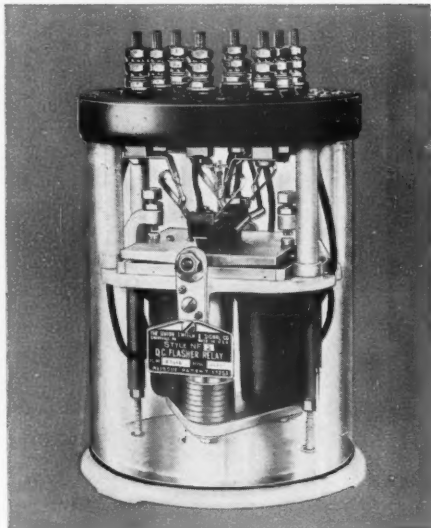
The illuminated "STOP" sign adds emphasis to the warning.

# HIGHWAY CROSSING PROTECTIVE DEVICES

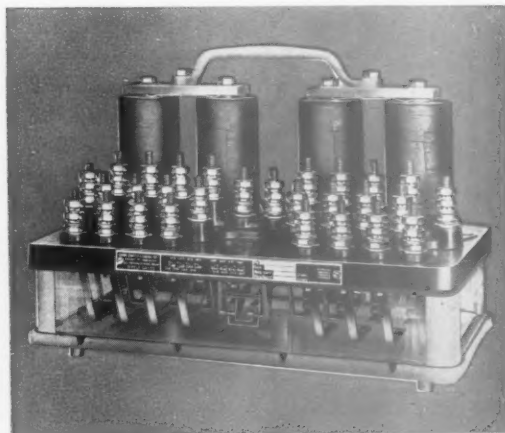
*that meet every requirement*



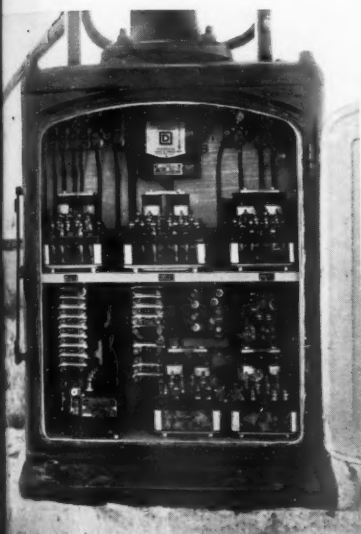
DN-11 Neutral Relay—for highway crossing signal circuit controls.



NF-2 Flasher Relay—to control flashing light units.



DX-13 Interlocking Relay—used in highway crossing signal circuit controls.



A. A. R. Standard Instrument Case—for housing small controlling apparatus.

Whether the requirements are for single or multiple track layouts; whether they call for A. A. R. or other recommended standards, or approval of federal, state or local authorities, there is a design of "Union" Flashing Light Highway Crossing Signal, sign, or controlling device, available either as a single unit or in combination, that will meet any specification. » » » » »

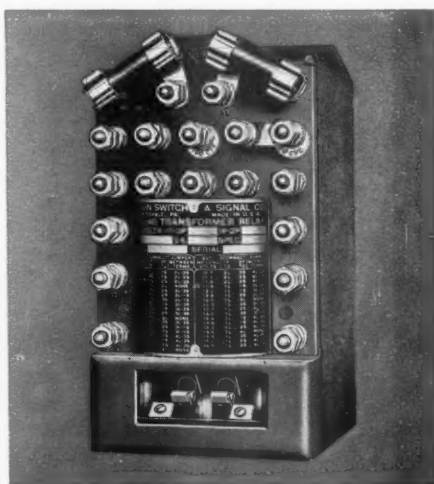
Our nearest district office will discuss with you any highway crossing or traffic problem, without obligation. » » »



A. A. R. Standard Instrument Case—for housing small controlling apparatus.



Relay House—Welded sheet steel construction—for use at special locations requiring larger housing facilities for apparatus.



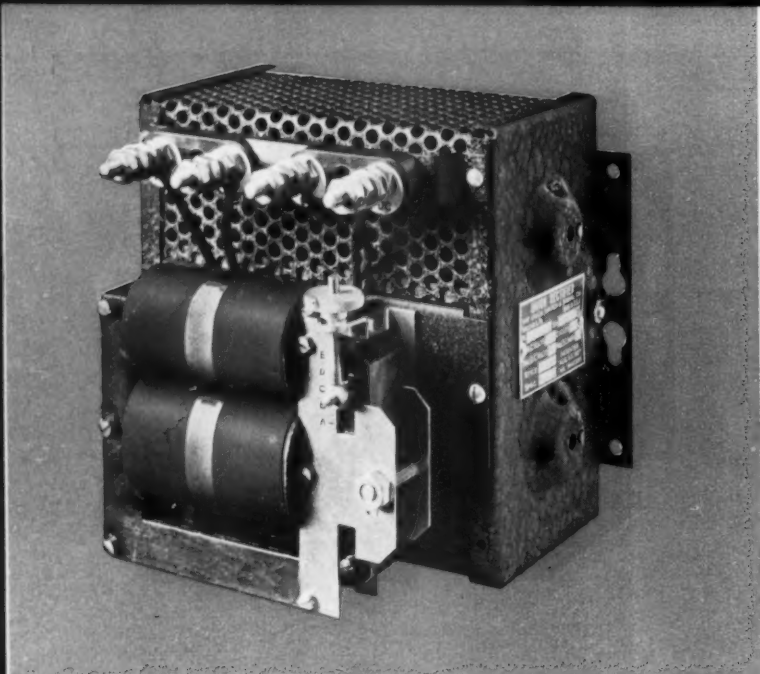
ANL-40 Power Transfer Relay—for emergency operation to switch power supply to storage batteries in case of a. c. outage.



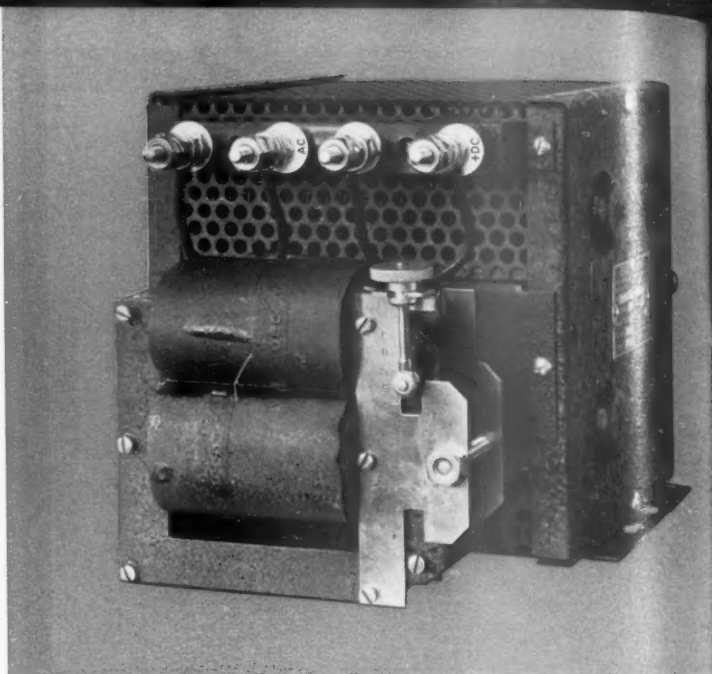
Fabricated Sheet Steel Instrument Case—for use at such locations which require more than the usual apparatus housing facilities.

**Union Switch & Signal Co.**  
SWISSVALE, PA.





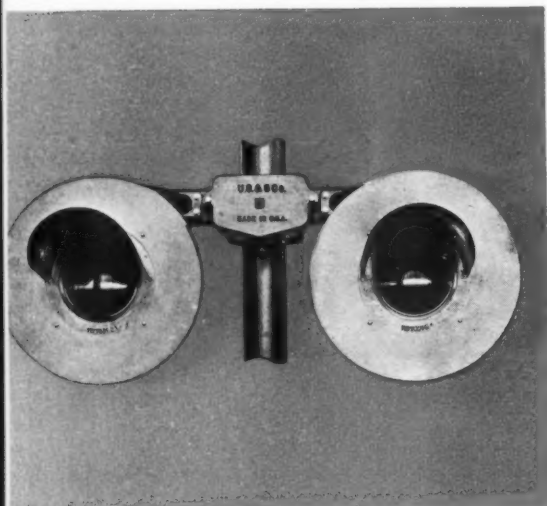
**RT-21 Copper Oxide Rectifier**—for average crossings  
—for maintaining charge of storage batteries.



**RT-42 Copper Oxide Rectifier**—for heavily loaded crossings—for maintaining charge of storage batteries.

# Make Highway-Railway Crossings *SAFE!*

The exacting requirements of highway-railway crossing protection call for refinements in the design and manufacture of the protective device and all its component parts that will give a reliable and unmistakable warning indication to users of the highway. Human life is at stake. It is, therefore, imperative that any installation be designed and installed with the view of maximum protection. This can best be achieved by an organization thoroughly familiar with the problem as a result of many years study and experience. » » » » » » » » » »



**New Type Light Unit Cross-arm with junction box in center. Easy maintenance.**

**"Union" engineers have had over fifty years experience in the design, manufacture and installation of railway signal apparatus and highway crossing protective devices. Each component part of "Union" highway crossing signals, auxiliary equipment and controlling devices is designed for a long life of reliable, efficient and economical service. » » » »**

**They are built of the same high quality material and workmanship expected of and received from all "Union" Signal Systems. They are built *up* to a standard, not *down* to a price. » » » »**



**Cover Glass Guard**—to protect lenses and lamps, particularly against mischievous boys.

1881

# Union Switch & Signal Co.

1935

SWISSVALE, PA.

NEW YORK

MONTREAL

## CHICAGO

ST. LOUIS

SAN FRANCISCO



4,978 of the objectionable cars will still be in service at the end of this year. It is planned to get rid of nearly all within three years.

Locomotives of all classes have arch-bar trucks. The record of passenger engines shows 62 per cent of all in service.

Estimating costs on the basis of the Missouri Pacific's figures, it is calculated that the Rock Island in 1934 spent \$100,000 on repairs to arch-bar trucks; to which is added \$21,732, the cost of 16 accidents occurring in that year; and the two derailments now reported add \$56,584 to this, not including damage to lading.

These and other factors, including increases of speed of trains and heavy loads, lead to the following recommendations: (1) that arch-bar trucks be removed from service at the earliest practicable date; (2) that until such trucks can be eliminated, a reduction of at least 30 per cent should be made in the load limit of each car; and (3) that interchange rules be modified to allow a receiving road to refuse to accept these cars from connections.

#### Fourteen Passengers Killed Near London

Press dispatches of June 15 report a rear collision of passenger trains on the London & North Eastern, at Welwyn, 20 miles north of London, in which 14 persons were killed and 29 injured.

#### R. F. C. Loans To Railroads

Up to May 31, according to its latest report, the Reconstruction Finance Corporation had authorized loans to railroads amounting to \$494,134,980, of which \$6,914,556 had been cancelled or withdrawn, \$485,092,692 had been disbursed, and \$71,654,411 had been repaid.

#### C. & O. Sends New Hopper to Chicago for Inspection

The Chesapeake & Ohio will have at Chicago during the days of the Mechanical Division convention next week one of a lot of ten new light-weight hopper cars which are under construction by the American Car and Foundry Company at its Huntington, W. Va., plant. This car involves the use of both Cor-Ten and Man-

Ten steel where the resistance to corrosion and additional strength can be utilized. Open-hearth steel is employed in the center sills, end posts, and some other details of the structure. The car weighs 34,600 lb. complete and, with a 10-in. heap, has 2,520 cu. ft. capacity. Of the three-hopper type, its load limit, on 5½-in. by 10-in. trucks, is 134,400 lb., and its pay load ratio is approximately 80 per cent.

#### Railroad Club of Chicago to Meet June 26

The Railroad Club of Chicago, the membership of which includes younger men of various fields of endeavor who are interested in railroads, will hold a meeting in the rooms of the Traffic Club of Chicago on June 26. The program will include two speakers of prominence.

#### Eastern Car Foreman's Outing

The annual golf tournament and field outing of the Eastern Car Foreman's Association will be held at the Race Brook Country Club, New Haven, Conn., on Thursday, July 18. The program will include golf and field events, details of which will be outlined in a later announcement.

#### "Calling All Employees"

The foregoing is the title of the placard which the committee on education, of the Safety section, A. A. R., has issued for the guidance of safety committees (and others) throughout the country in the month of July. The main illustration is a picture of a railroad officer at a microphone, shouting to all concerned that the habit of *looking both ways before walking on any track* is one of the serious essentials of good railroad practice.

The committee has found that thousands of railroad men all over the country have yet to see the posters which this committee has issued month by month, illustrating the dangers of their work and the need of caution; and this renewed appeal to all employees is deemed the most appropriate subject for present attention.

It is found that of all trainmen killed in 10 years, 16.7 per cent were struck or run over by engines or cars and, of employees other than trainmen, this percent-

age is much higher; 2,010 being killed in this manner out of 5,497 such employees killed in all accidents.

The successive circulars which have been issued have apparently had some effect as, in the past 10 years, the number of trainmen killed by being struck or run over has been reduced 60 per cent, while in trainmen killed from all causes the reduction has been only 52 per cent.

The circular sets forth at length five typical accidents under this head, with pictures illustrating how they happen.

#### Hiawatha Carries 4,968 Persons in 11 Days

The "Hiawatha," fast train of the Chicago, Milwaukee, St. Paul & Pacific, carried 4,968 revenue passengers in the first 11 days of operation. The best day's record was set on Saturday, June 8, when 335 revenue passengers were carried northbound and 328 southbound, or a total of 663. The average total northbound for the first 11 days was 222, while the southbound average was 231, a daily total of 453.

#### Study Effect of Securities Act on Security Flotation

In an effort to determine what effect the securities act of 1933 has had on financing operations, the Committee on Financial Legislation of the National Conference of Business Paper Editors and the Associated Business Papers, Inc., has made a broad study of the question, the results of which have been published in a booklet entitled "The Securities Act of 1933—Its Effect on Financing." This study, which is the fourth of a series of factual studies dealing with current national questions of interest to industry, seeks to answer the questions "Has the Securities Act of 1933 deterred financing?" and "What have been its net effects on industry?"

After reviewing the trend of financing in this country in recent years it points out that in England, where the securities act deals with questions much more leniently than does comparable legislation in this country, the volume of offerings has increased rather steadily since 1931, whereas in the United States they continued at a low level until recently. The study ana-

#### Proof That Railroads Can Act Together

There is life and vigor and a freshened spirit in American railroad management today. Mr. Eastman is Federal Co-ordinator of Transportation because of a general belief that the railroads themselves cannot co-ordinate their activities—a belief which Mr. Eastman has earnestly helped to induce. But the Western railroads are now proving that, in an important branch of their business, they are perfectly able to do their own co-ordinating; and this example should stir the Eastern railroads to get together and make a similar demonstration.

—From *Business Week*, June 15, 1935.

This week was Railroad Week in the West. It marked the culmination of the campaign which for 3 months has been conducted by all lines west of Chicago, St. Louis and New Orleans, in cooperation with the Pullman Co., and under the supervision of Harry Guy Taylor, chairman of the Western Association of Railway Executives. For this purpose \$450,000 was raised, and advertising was placed in various media, chiefly Western newspapers.

A few years ago, it took you 72 long hours—3 ungodly days and nights—to travel by rail from Chicago to the

Coast. In summer the desert heat was enough to bake you and grime you and make you want to crawl under the seat and escape from the blistering windows. Now one railroad will carry you on the same journey in less than 40 hours. All roads have amazingly increased their speed. The trains are streamlined, air-conditioned and dustless. The rates have been cut. This is the story the Western roads have united to tell; and the fact that they have united is as notable as the brilliant improvement in their service.

lyzes the various features of the act that are held to have a deterring effect on the volume of security flotations, but adds that the effects of some of these have been mitigated by amendments. It gives opinions concerning the effects of the legislation drawn from interviews with bankers, lawyers, accountants and business men and closes with an appendix which contains a summary of the act. Copies of this study may be obtained at 10 cents each from the Associated Business Papers, Inc., 340 West Forty-Second street, New York.

### Institution of Railway Signal Engineers

M. G. Tweedie, Reading, England, secretary of the Institution of Railway Signal Engineers, has issued the *Proceedings* of the Institution for 1934-35. This paper-covered volume contains the reports of the meetings of October, November and December, 1934, and January, 1935. Each meeting discussed a single problem: The distant signal problem; electrically-controlled hump yards; intermediate block signaling, and rectifiers in railway signaling. The book contains the usual indexes.

### I. C. C. to Investigate Intrastate Rates

The Interstate Commerce Commission, on petition of the railroads, has ordered an investigation as to the effect on interstate commerce of the failure of the Minnesota Railroad and Warehouse Commission to authorize or permit increases in intrastate freight rates corresponding to the emergency increases authorized by the federal commission for interstate commerce in Ex Parte No. 115. A similar investigation has been ordered as to the refusal of the Public Service Commission of South Carolina to authorize the increases on certain commodities.

### New Haven Operates "Mystery" Excursion

The first "mystery trip" excursion to be operated out of New York was run on June 9 by the New York, New Haven & Hartford to Great Barrington, Mass., in the Berkshires. Approximately 100 amateur mountain climbers and hikers made the journey on the train which left Grand Central Terminal for the unknown destination at 7:55 a.m. The train which was called the "Rambler," included two coaches, a dining car and a club car; the round-trip fare was \$2.50. The New Haven plans to operate the Rambler on other mystery trips on forthcoming Sundays if there is a sufficient demand.

### Greyhound Negotiating with New York Central

The Greyhound Corporation, holding company for the various units of the country-wide Greyhound Lines bus system, has submitted to the New York Central a plan for the co-ordination of rail and highway passenger transport in the territory served by that road. Under the proposal it is understood that the New York Central would purchase an interest in the Eastern Greyhound Lines, Inc., and the latter would provide train-replacement, feeder and co-ordinated bus services in N. Y. C. territory. At the New York Central of-

fices it was said that an announcement on the Greyhound proposal might be made in the latter part of this week.

### Medal of Honor Conferred

Upon recommendation of the Committee on Award of Medals of Honor, approved by the Interstate Commerce Commission, the President has awarded a medal of honor to Miss Dorothy Barton of West Elizabeth, Pa., under the act of February 23, 1905, which provides for bronze medals of honor to be awarded for outstanding feats of bravery in connection with the saving of life upon railroads.

On January 22, 1935, at West Elizabeth, Pa., as a Pennsylvania freight train approached a crossing, a small boy in crossing the tracks caught his foot in the flangeway of the outside guard rail. Dorothy Barton, 16 years old, who was approaching the crossing on her way to school, observed the plight of the boy. The train was then at the next crossing to the north; she waved her handkerchief as a signal for the train to stop, and running to the boy grasped him under the arms and pulled him free and clear of the track just a few seconds before the train reached the crossing; the train stopped with its engine about two car lengths beyond the crossing where the two children stood.

Forty-one medals of this character have been awarded since the enactment of the Medals of Honor Act in 1905.

### New England Governors Consult Railway Executives

Plans for the co-ordinated operation of four New England railroads were submitted to four railroad executives on June 14 by the New England Governors' railroad committee. The railroad executives are: Presidents M. W. Clement of the Pennsylvania, F. E. Williamson of the New York Central, Howard S. Palmer of the New York, New Haven & Hartford, and Edward S. French of the Boston & Maine. Following the June 14 meeting Governor James M. Curley of Massachusetts said that the New England governors favored the co-ordination of operations of the New Haven, the Boston & Albany, the Boston & Maine and the Maine Central and desired the co-operation of the Pennsylvania and New York Central in effecting the most economical routing of New England rail traffic.

### Colonel Wilgus Honored

Col. William J. Wilgus, widely known because of his achievements in electrifying the New York terminal of the New York Central, and who recently reorganized the Works Division of New York City's Emergency Relief Bureau, was given a dinner at the Engineers' Club, New York City, on Thursday evening, June 14, by a large group of engineers. He was lauded not only for his public service in connection with the Emergency Relief Bureau, but also for his work with the American Military Railway system in France during the World War.

Arthur S. Tuttle, president of the American Society of Civil Engineers, presided. Among the speakers who paid tribute to Colonel Wilgus' public service con-

tributions were J. P. H. Perry, vice-president, Turner Construction Company; Ole Singstadt, consulting engineer of the Port of New York Authority; George W. Burpee of Coverdale & Colpitts; Arthur B. Sheridan, chief engineer of the Bronx; Colonel Willard Chevalier, vice-president, McGraw-Hill Publishing Company, and L. B. Stillwell, consulting engineer.

### Trans-Missouri-Kansas Board Meeting

The forty-second regular meeting of the Trans-Missouri-Kansas Shippers Board will be held at Salina, Kan., on June 26. Besides reports of various committees, the program provides for a discussion of Factors Relating to the Season's Wheat Crop Movement by J. J. Kraettli, president of the J. E. Rahn Grain Company; of Any-Quantity Livestock Shipping Plan by R. L. Lohmuller of the Livestock Shipper, A. P. Boles, assistant general livestock agent of the Missouri Pacific and H. R. Timberlake, traffic manager of the East St. Louis Junction; and of Interior Livestock Markets As An Answer to Livestock Trucking by C. E. Perkins, manager of the Parsons (Kan.) Chamber of Commerce. At a joint luncheon with the Salina Chamber of Commerce, Roy A. Bailey, president of the Kansas Chamber of Commerce, will be the principal speaker.

### Excursions for Groups Visiting Railroad Facilities

Sixty members of the New York chapter of the Railway and Locomotive Historical Society accepted the invitation of the Delaware & Hudson and visited that road's Colonie, N. Y., shops on Sunday, June 16. The New York Central, which carried the party to Albany on the second section of its 9 a. m. train out of New York, also co-operated by providing for the group a special observation coach and a diner. At Albany special buses were provided by the United Traction Company to transport the party to and from the shops at Colonie.

At the shops the group was met by George S. Edmonds, superintendent of motive power of the Delaware & Hudson; George Brown, general master mechanic; H. G. Becker, superintendent of the Colonie shops, and the entire shop supervisory staff. Following an address of welcome by Mr. Edmonds the party went on a three-hour inspection tour of the shops and locomotives, with members of the D. & H. motive power staff acting as guides. On the return trip the New York Central provided a special coach and dining car to carry the group back to New York.

The New England division of the Railroad Enthusiasts, Inc., has arranged for Sunday, June 23, an excursion to the New York Central's Selkirk Yard. The party will be carried on a Boston & Albany special train, with diner, which will leave Boston at 7 a. m. and run direct to the yard, thence operating throughout the facilities there to give the party a view of the layout. The return trip will be made on a train arriving in Boston at 8:30 p. m. The Boston & Albany is advertising this excursion as open to the public, featuring



# Specialization

With a swiftness never previously attained by a liner in crossing the Atlantic, the S. S. *Normandie* justly became the *Queen of the Seas*. Her supremacy is assured by specialization in design, materials, and equipment. So that the objectives of speed and reliability would be successfully and positively attained, the equipment for her power plant was selected with utmost care. It is natural that the superheaters selected embody the same integrally forged return bend construction as used for Elesco locomotive superheaters . . . as this type of superheater construction is best assurance of high efficiency and will safeguard the reliability of her power generating equipment.

These same superheater principles also provide high efficiencies for motive power and safeguard your train schedules. But, like any other boiler parts, superheater equipment requires proper attention as it becomes worn. Consequently, when superheater units become unserviceable after years of severe duty, they must be restored to a condition comparable to new units—otherwise they had better be scrapped.

At about half the cost for new units, you can have unserviceable units restored to a condition practically equal to new units through Elesco unit REmanufacturing service. This Elesco service, by employing the methods used to manufacture new units, rebuilds into superheater units many added years of duty . . . giving assurance of full economy and protection against the hazards of repairing superheater units.

Elesco unit REmanufacturing service embodies our 25 years' experience in manufacturing and servicing superheater equipment . . . it is based on specialization.



Photo N. Y. World-Telegram

## S. S. NORMANDIE

Four 40,000-hp. turbo-generators propel this 79,000-ton liner at a speed of over 30 knots. For these huge generators, steam at 400-lb. pressure is superheated to 680 deg. F. by superheaters of the Elesco type, designed and manufactured by our French associates, Compagnie des Surchauffeurs.

# THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, Inc.

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Canada: The Superheater Company, Limited, Montreal

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles



the opportunity to ride both ways through the Berkshires in daylight at a low fare.

### Charter Tax of I. C. Gives Seven Cents of Each Dollar to the State

Seven cents out of every dollar taken in by the charter lines of the Illinois Central since 1857 have gone to the state. Prior to that date, the charter tax amounted to five per cent of gross revenues. The total amount of the railroad's charter tax payments from 1855 to 1934, inclusive, was \$87,473,204, an amount exceeding by \$5,204,325 the latest inventory value of all state-owned buildings and other state-owned improvements in Illinois, exclusive of land and personal property. The charter taxes paid by the Illinois Central apply only to its 705 miles of original lines in Illinois. They do not include non-charter lines, on which state and county taxes, school taxes, road and bridge taxes, township and municipal taxes and assessments have been paid by the railroad on about 1,450 miles of lines in 55 counties in the state. Statistics for non-charter lines are not available from the beginning, but for the 10 years 1924 to 1933, inclusive, Illinois Central non-charter tax payments in Illinois averaged \$1,285,000 a year. The railroad's total charter and non-charter line tax payments in Illinois during this 10-year period averaged \$4,138,000 a year.

In 1855, charter taxes paid amounted to \$29,751 and since then have increased until in 1934 they amounted to \$1,519,849. The inventory value of state-owned buildings and other improvements in 1934 amounted to \$82,269,879, including \$77,479,042 for buildings and \$4,789,837 for other improvements.

By way of contrast, the Illinois Central during the last three years has been operated at a net deficit of \$6,352,319 and during this time the stockholders have received nothing.

### Improved Methods for Handling Scrap Recommended

Co-ordinator Eastman on June 19 sent to the Regional Co-ordinating Committees a voluminous report prepared by his Section of Purchases in regard to handling and disposition of scrap by Class I, II and III railroads and switching and terminal companies. The statements of fact contained in the report are based on information furnished by the carriers in response to an inquiry dated October 29, 1934, covering operations during the year 1933. Careful checking, study, and analysis of the facts by the Section of Purchases have led to the general conclusion that substantial savings can be made by the carriers through reducing the cost of these operations and securing a higher average price for scrap sold. Specific conclusions, with estimates of savings or increased returns, are set forth in the introduction to the report.

Attention is called to the memorandum from R. L. Lockwood, the director of the Section of Purchases transmitting the report, in which he states that this report is not presumed to indicate means whereby an individual railroad can improve its situation in respect to these operations, but is intended to show the situation from

the viewpoint of the railroads as a whole.

"The sale of scrap represents a substantial amount of money, even under present conditions," Mr. Eastman said. "An increase of 15 per cent in net realization would amount to more than \$4,000,000 annually on the basis of 1933 transactions. I am transmitting this report to you in the hope that it will provide a useful basis on which individual roads can determine ways and means for increasing their net realization from the disposition of scrap, and that it may also be useful to the Association of American Railroads in developing bases for co-operative action among roads to the same end."

## Equipment and Supplies

### FREIGHT CARS

THE UNITED CARBON COMPANY has ordered from the American Car & Foundry Company two covered hopper cars for transporting carbon black.

NORFOLK SOUTHERN.—The Public Works Administration has announced an allotment of \$1,040,030 to this company for the acquisition of 500 steel box cars, at an estimated cost of \$1,155,000. The railroad will supply the balance above the PWA loan.

### PASSENGER CARS

THE UNITED FRUIT COMPANY is inquiring for lots of 5, 10 or 15 passenger cars to be of first, second or third-class for export.

### IRON AND STEEL

CANADIAN NATIONAL.—An order for 80,000 tons of steel rail will be divided equally between the Dominion Steel & Coal Corporation, Sydney, N. S., and the Algoma Steel Corporation, Sault Ste. Marie, Ontario; this has been arranged by the Dominion government as a re-employment measure, it was recently announced at Ottawa. The rails will be delivered to the Canadian National System when needed and will be paid for on delivery. It was said that the government will pay the carrying charges on financing involved pending completion of the transaction. Passage of the necessary order-in-council was secured with the joint concurrence of Finance Minister E. N. Rhodes and Honorable R. J. Manion, minister of railways and canals. The government will be obligated to the extent of \$1,680,000 in the two orders.

### MISCELLANEOUS

NEW YORK CENTRAL.—A contract has been given to the Carrier Engineering Corporation, New York, for furnishing, delivering and installation of additional refrigeration in existing refrigerating plant in the Grand Central Terminal, New York City, for the purpose of furnishing chilled water for air conditioning various restaurants and concessions in the terminal.

## Construction

BALTIMORE & OHIO.—The New York Public Service Commission has approved as not excessive a low bid of \$112,842, in connection with the elimination of the state highway crossing of this road on the Scottsville-Mumford highway in the Town of Wheatland, N. Y.

CENTRAL VERMONT.—Contracts have been given to the O. W. Miller Company, Springfield, Mass., for masonry work and to the American Bridge Company, New York, for the steel work on the reconstruction of the bridge at Hartford, Vt., to cost about \$118,000.

CHESAPEAKE & OHIO.—A contract has been given to the Watts & Suhrbier Company, Toledo, Ohio, for the construction of six buildings at Presque Isle coal dock, Toledo, Ohio, to cost about \$65,000.

STATEN ISLAND RAPID TRANSIT RAILWAY COMPANY.—This company, a subsidiary of the Baltimore & Ohio, was reported in the *Railway Age* of June 8, page 898, as having received a low bid of \$947,061 from the P. T. Cox Contracting Company, Inc., New York, has awarded the contract to that company. The work includes grading, masonry, etc., in connection with the Port Richmond-Tower Hill, Staten Island, N. Y., elimination work, involves the use of about 1,700 tons of reinforced steel.

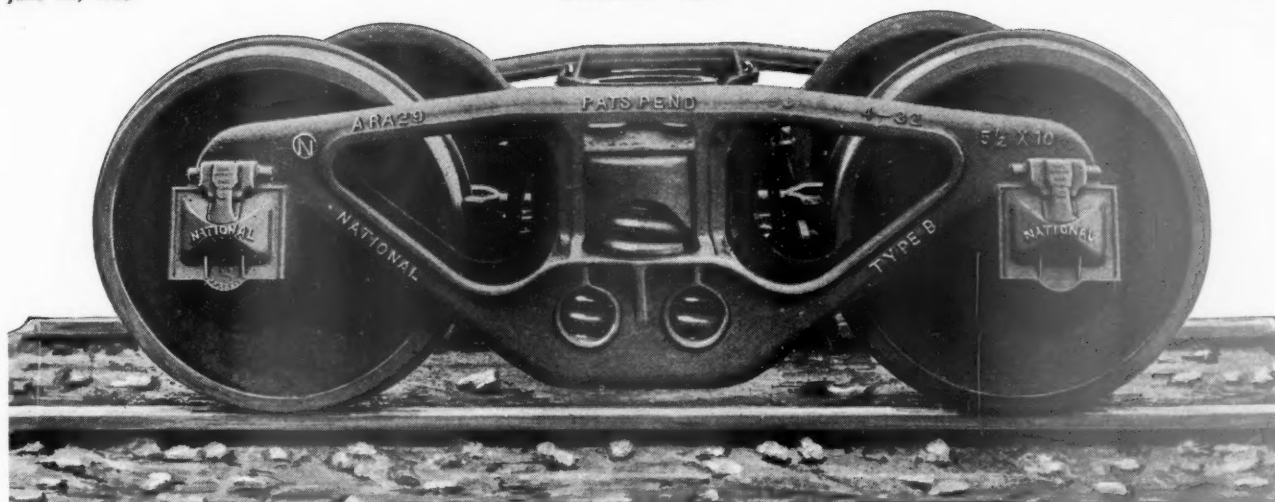
### Grade Crossing Elimination Program in State of New York

The New York Public Service Commission has received from its chief engineer a report on 146 grade crossing elimination projects involving 278 crossings estimated to cost over \$53,000,000, to which federal funds can be applied under a new law recently signed by Governor Lehman, authorizing the superintendent of public works to select the projects on which grants from the federal government will be used. The recently enacted law transfers certain powers heretofore vested in the Public Service Commission to the superintendent of public works, and authorizes the application of federal funds to certain grade crossing eliminations which the superintendent of public works is authorized to select. The list consists of proposed eliminations heretofore ordered by the Public Service Commission and located outside of New York City, provided contracts have not heretofore been let or bids advertised for, and provided the projects are not located in Buffalo or Syracuse.

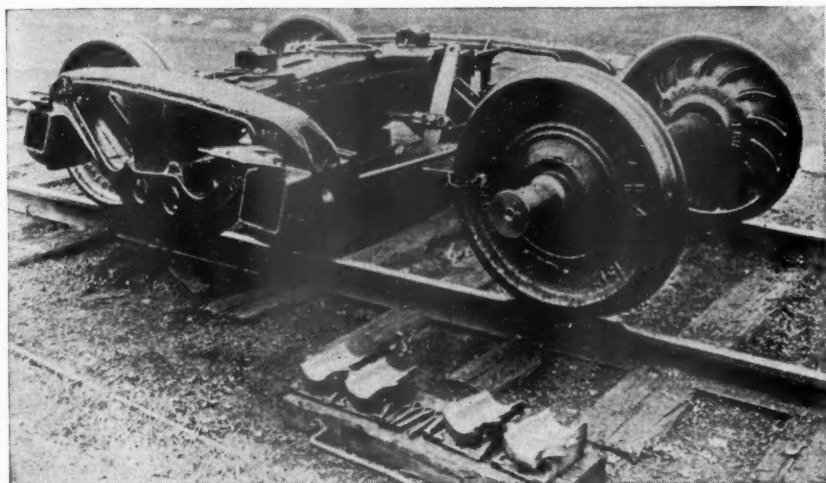
The report of the commission's chief engineer explains that "federal funds may not be used on projects for which elimination orders are hereafter adopted, no matter how important such projects may be or how urgently needed."

So far as the Public Service Commission is concerned, all of the 146 projects listed in the report of the commission's engineer await only the designation of the superintendent of public works for elimi-

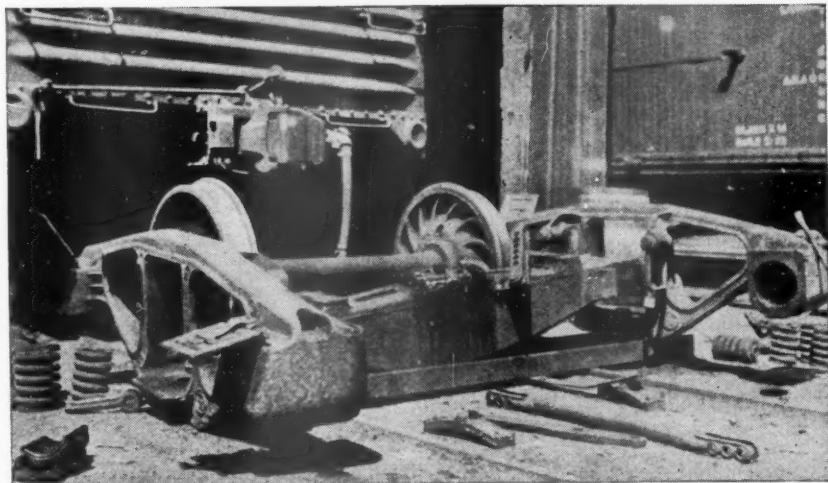
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## National Type B Truck — In The Lead



Type B Truck Quick Wheel Change



Photograph taken during typical wheel change on truck with spring plank

Spring Plank not used with National Type "B" Truck. Over four years satisfactory service proves conclusively its dependability and economy.

Elimination of spring plank effects marked savings in cost and weight.

Quick Wheel Change, Fewer Parts and easy riding are salient features of the

### NATIONAL Type "B" Truck

## NATIONAL MALLEABLE AND STEEL CASTINGS CO.

*General Office — Cleveland, O.*

Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco  
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.



nation work to proceed with federal money.

In addition to the projects covering 278 crossings which are now ready for the application of federal funds, the report states that the commission is at work upon projects involving the elimination of 171 crossings, estimated to cost \$34,152,000, in which no determination has been made as to the exact method of accomplishing the eliminations. In 27 other cases, the commission has issued elimination orders from which appeals have been taken to the courts.

"Since the elimination of grade crossings has been under the supervision and jurisdiction of the Public Service Commission," says the report of the chief engineer, "535 dangerous crossings in this state have been eliminated at a total cost of about \$43,000,000, and construction work is now progressing on projects involving about 130 other crossings, the elimination of which is estimated to cost \$23,428,000. In still other cases, bids have been received or were about to be called for and contracts would now be let were it not for recent legislation."

## Supply Trade

**H. C. Harragin**, vice-president and secretary of The Bird-Archer Company, of New York, is taking up new duties as vice-president of **The Bird-Archer Company, Ltd.**, with headquarters at Montreal, Canada.

**J. N. Bauman**, assistant sales manager of the **White Motor Company**, Cleveland, Ohio, has been appointed general sales manager to succeed George F. Russell, resigned. Mr. Bauman has been associated with the White Company since 1922 and has been assistant sales manager for the past year.

**Harold L. Gieger** has joined the field staff of the development and research department of the **International Nickel Company, Inc.**, New York. Mr. Gieger's experience has been with the operating and metallurgical departments of the Inland Steel Company and since 1929 as chief metallurgist of the Wisconsin Steel Company—a subsidiary of International Harvester.

### Railway Car Building Industry to Adhere to Code Rules

At a recent meeting of the American Railway Car Institute, New York, the directors adopted the following resolution:

"Resolved that, pending further clarification of the status of N. R. A. by legislation or otherwise, it is the intention of the railway car building industry to adhere to the schedule of hours and rates of pay prevailing under the Railway Car Building Industry Code and to comply with all the other provisions of said code except those the compliance with which might, in the opinion of our counsel, be violative of the anti-trust laws."

## Financial

**BIRMINGHAM & SOUTHEASTERN.—R. F. C. Loan.**—The Interstate Commerce Commission has authorized the extension for 3 years of a loan of \$36,000 by the Reconstruction Finance Corporation to this company, representing a reduction of \$5,300 in the original loan of \$41,300. The loan is to be paid off in regular monthly installments.

**BOSTON & MAINE.—Abandonment.**—This company has applied to the Interstate Commerce Commission for authority to abandon its lines between Hudson, N. H., and Fremont, 21 miles, and between Ep- ping, N. H., and West Gonic, 18 miles.

**CENTRAL VERMONT.—New Directors.**—Frederick W. Shepardson of Burlington, Vt., and Viggo I. Bird, president of the Hartford (Conn.) Electric Light Company, have been elected directors of this railway.

**CHICAGO & NORTH WESTERN.—Conference on Reduction of Fixed Charges.**—The finance committee of this company met in New York on June 18 with representatives of its bondholders at which time plans for reducing the road's fixed interest obligations were discussed.

**ERIE.—Abandonment.**—The Interstate Commerce Commission has authorized this company and the New York & Greenwood Lake to abandon that portion of the line of the latter company from Erskine, N. J., to Sterling Forest, 8.4 miles, effective September 30.

**FLORIDA EAST COAST.—Abandonment.**—The receivers have applied to the Interstate Commerce Commission for authority to abandon the Palm Beach branch, in Florida, 1.47 miles.

**MINNEAPOLIS & ST. LOUIS.—Sale Postponement.**—Sale of the Minneapolis & St. Louis was postponed for the fifth time on June 11, when no bidders appeared at a scheduled sale. A new sale date, August 10, was set.

**MOBILE & OHIO.—R. F. C. Loan.**—The Interstate Commerce Commission has authorized the extension for 3 years the time of payment of a loan of \$877,599 from the Reconstruction Finance Corporation to the receivers of this company. The loan was originally \$1,070,599, but \$193,000 has been repaid. The loan is evidenced by receivers' certificates of indebtedness constituting a first lien on all properties and assets of the company.

**OREGON-WASHINGTON.—Abandonment.**—This company and the Des Chutes have applied to the Interstate Commerce Commission for authority to abandon the line of the latter from Ainsworth, Ore., to North Junction, 71 miles, and to operate under trackage rights over the line of the Oregon Trunk between Oregon Trunk Junction and North Junction.

**OZARKS SOUTHERN.—Foreclosure sale.**—The Ozarks Southern, extending from Ava, Mo., to Mansfield, 15 miles, and owning 1

locomotive and 2 passenger cars, was sold for \$25,000 to Claude E. Vrooman, St. Louis, Mo., holder of a first mortgage, at an auction sale at Springfield, Mo., on June 17. Mr. Vrooman plans to junk the road which has suffered because of bus and truck competition.

**PERE MARQUETTE.—R. F. C. Loan.**—This company has applied to the Reconstruction Finance Corporation for a three-year extension from June 19 of its \$3,000,000 loan.

**ST. LOUIS-SAN FRANCISCO.—Receiver-ship.**—An order directing John G. Lonsdale, co-trustee of the St. Louis-San Francisco, to file suit against two New York banking firms, E. N. Brown, chairman of the Frisco board, and others to recover losses suffered by the road in stock purchases was issued on June 14 by Federal Judge Charles B. Faris. The order authorized suits against Speyer & Co. and J. & W. Seligman & Co.

**SEABOARD AIR LINE.—Macon, Dublin & Savannah Bonds.**—The Interstate Commerce Commission has authorized the Macon, Dublin & Savannah to issue \$94,000 of first mortgage 40-year 5 per cent bonds to be pledged as collateral security for a demand note of \$75,000 held by the Seaboard Air Line.

**WESTERN PACIFIC.—Reorganization.**—Large holders of securities of this company are reported to have reached an agreement with its management and directors regarding a plan of voluntary reorganization of the company's financial structure. The proposal will now be submitted to the Reconstruction Finance Corporation.

### Average Prices of Stocks and of Bonds

	June 18	Last week	Last year
Average price of 20 representative railway stocks..	34.80	33.45	43.78
Average price of 20 representative railway bonds..	75.49	74.66	78.86

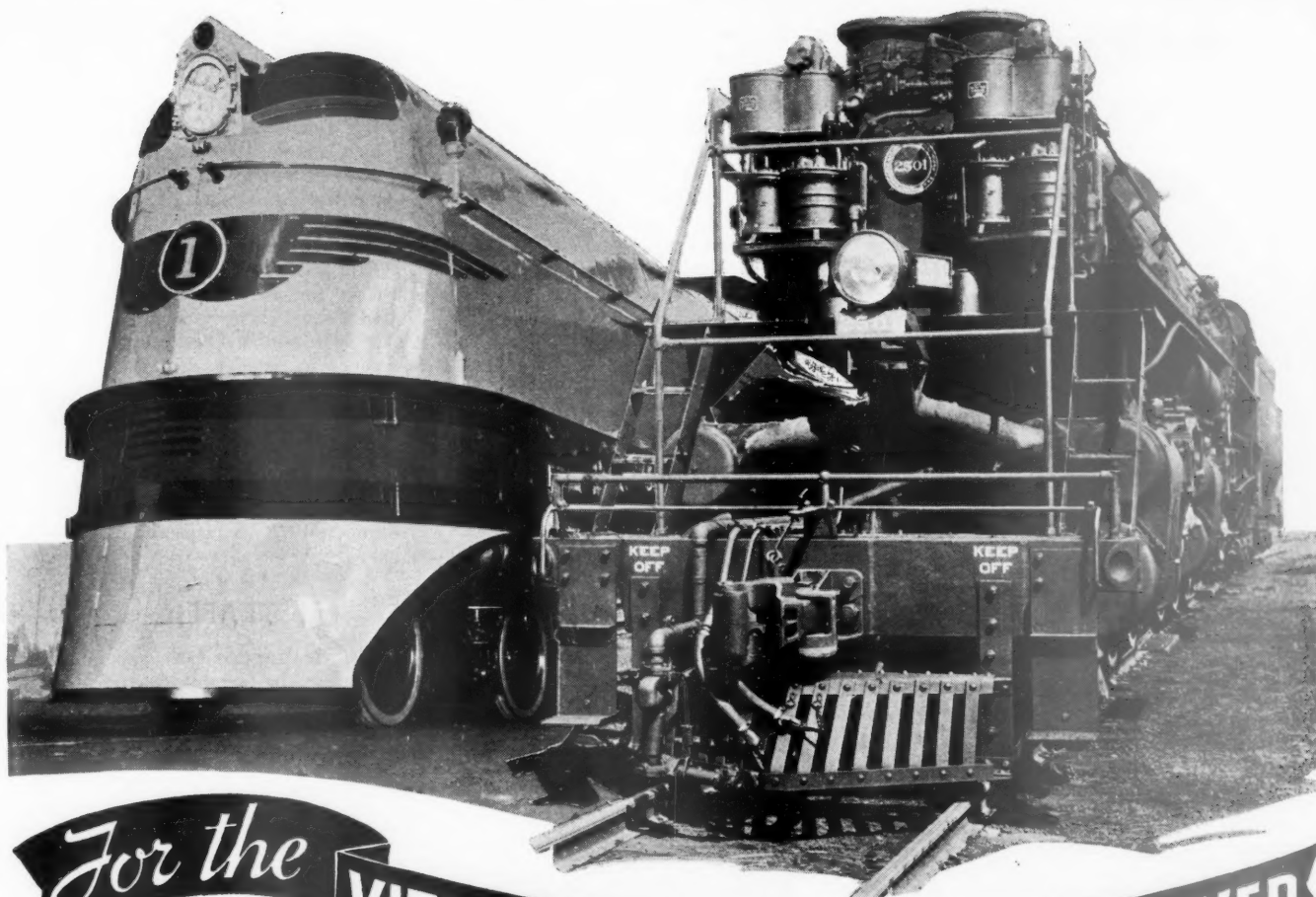
### Dividends Declared

Alabama Great Southern.—Preferred, 3 per cent, payable August 15 to holders of record July 13.  
Allegheny & Western.—\$3.00, semi-annually, payable July 1 to holders of record June 20.  
Canada Southern.—\$1.50, semi-annually, payable August 1 to holders of record June 28.  
Cayuga & Susquehanna.—\$1.20, semi-annually, payable July 3 to holders of record June 20.  
Old Colony.—\$1.75, quarterly, payable July 1 to holders of record June 15.  
Providence & Worcester.—\$2.50, semi-annually, payable July 1 to holders of record June 13.  
St. Joseph & Grand Island.—First Preferred, \$1.00, payable June 28 to holders of record June 25.  
Western New York & Pennsylvania.—Preferred, \$1.25, semi-annually, payable July 1 to holders of record June 29.

**MAY SHIPMENTS OF RAILROADS LOCOMOTIVES** from the country's principal manufacturing plants totaled 18, as compared with 15 in April and 34 in May, 1934, according to reports received by the Bureau of the Census, U. S. Department of Commerce. Unfilled orders at the end of May totaled 68 locomotives (61 electric and 7 steam), as compared with 136 (76 steam and 60 electric) at the end of May, 1934. These figures do not include data on locomotives built by railroads in their own shops.

Continued on next left-hand page





*For the*

**VITAL PARTS ON MODERN POWER**

APPLICATIONS of HUNT-SPILLER *Air Furnace* GUN IRON Wearing Parts will be found on light-weight, high-speed, stream-lined units — on heavy, articulated power and on practically all of the modern locomotives constructed during recent years.

This unusual endorsement becomes more strikingly significant when it is realized that the requirements of service are constantly increasing — that railroads require materials which contribute to the new standards of efficiency and economy. Locomotives completely equipped with HSGI are recognized as the best revenue producers.

**HSGI**

Reg. U. S. Trade Mark

Cylinder Bushings  
Cylinder Packing Rings  
Pistons or Piston Bull Rings  
Valve Bushings  
Valve Packing Rings  
Valve Bull Rings  
Crosshead Shoes  
Hub Liners  
Shoes and Wedges  
Floating Rod Bushings

Parts Finished For  
Application

Dunbar Sectional Type Packing  
Duplex Sectional Type Packing  
for Cylinders and Valves  
(Duplex Springs for Above  
Sectional Packing)  
Cylinder Snap Rings  
Valve Rings All Shapes

**HUNT-SPILLER MFG. CORPORATION**  
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*Air Furnace* **HUNT-SPILLER  
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## Railway Officers

### EXECUTIVE

#### J. M. Hood Elected Head of Short Line Group

J. M. Hood, formerly chief operating officer of the Akron, Canton & Youngstown, with headquarters at Akron, Ohio, has been elected president of the American Short Line Railroad Association, with headquarters at Washington, D. C. He succeeds W. L. White. Mr. Hood has served in various capacities with a number of railroads for 27 years. He was born on October 30, 1891, at Beach City, Ohio, and entered railway service in 1908, as a trackman on the Baltimore & Ohio, serving in this capacity and as an operator and agent until 1910. In that year he entered the service of the Wheeling & Lake Erie as an operator and later served as a dispatcher and clerk in the mechanical department. In 1912, Mr. Hood went with the Akron, Canton & Youngstown as chief clerk in the operating department, being advanced to assistant superintendent two years later. In 1918 he was further advanced to superintendent and in 1924, he was made general superintendent. Five years later Mr. Hood was advanced to vice-president in charge of operations, his title being changed to chief operating officer in 1933, after the railroad had been granted a voluntary petition in bankruptcy. Mr. Hood has been active in the affairs of the Short Line Association and at the time of his recent election to the presidency he was serving as a regional vice-president. He is also third vice-president of the American Association of Railroad Superintendents.

### FINANCIAL, LEGAL AND ACCOUNTING

Edward A. Kaier, who has been connected with the legal department of the Pennsylvania, with headquarters at Philadelphia, Pa., has been appointed assistant solicitor, with headquarters at Chicago. Mr. Kaier, whose appointment becomes effective on July 1, will succeed to the duties of the late John L. Aber, assistant general solicitor, whose death on April 23 was noted in the *Railway Age* of April 27.

### OPERATING

W. F. Kirk, eastern regional director on the staff of the Federal Co-ordinator of Transportation, with headquarters at New York, and formerly general superintendent of the Western district of the Missouri Pacific, has returned to the service of that road as assistant general manager, with headquarters at St. Louis, Mo. J. W. Rea, who was appointed acting general superintendent of the Western district, with headquarters at Kansas City, Mo., at the time Mr. Kirk left this posi-

tion to enter government service, has been appointed general superintendent of the same district. J. Davis, who was appointed acting superintendent of the Arkansas division, with headquarters at Little Rock, Ark., at the time Mr. Rea left his position to assume the post at Kansas City, has been appointed superintendent of the same division.

R. J. McDermott, assistant to the general superintendent of transportation, has been appointed assistant general superintendent of transportation, with headquarters as before at St. Louis, succeeding William H. Haley, deceased.

C. E. McCarty, inspector of transportation of the Kansas City Southern, who has been appointed superintendent of terminals at Kansas City, Mo., as noted in



C. E. McCarty

the *Railway Age* of June 8, entered the service of the K. C. S. as timekeeper for an extra gang in 1903, at the age of 17 years. He then served successively as a yard clerk, as a clerk in a local freight of-

fice and as traveling auditor until 1908, when he left this company to accept a position with the Rock Island Lines as traveling auditor, with headquarters at Ft. Worth, Tex. Mr. McCarty returned to the K. C. S. in 1909 as traveling auditor and later served as chief clerk to the superintendent at Texarkana, Tex. Three years later he went with the Baltimore & Ohio as assistant trainmaster at Cumberland, Md., leaving this company in 1917 to enlist in the Eleventh Engineers of the United States Army, being commissioned a first lieutenant in France in 1918. While in France he acted as general yardmaster at Gievres, and in March, 1919, he went with his railway outfit to North Russia to operate the Murman Railway. After his discharge from the army, Mr. McCarty engaged in other business for several years, returning to the Kansas City Southern in November, 1925, as inspector of transportation.

### TRAFFIC

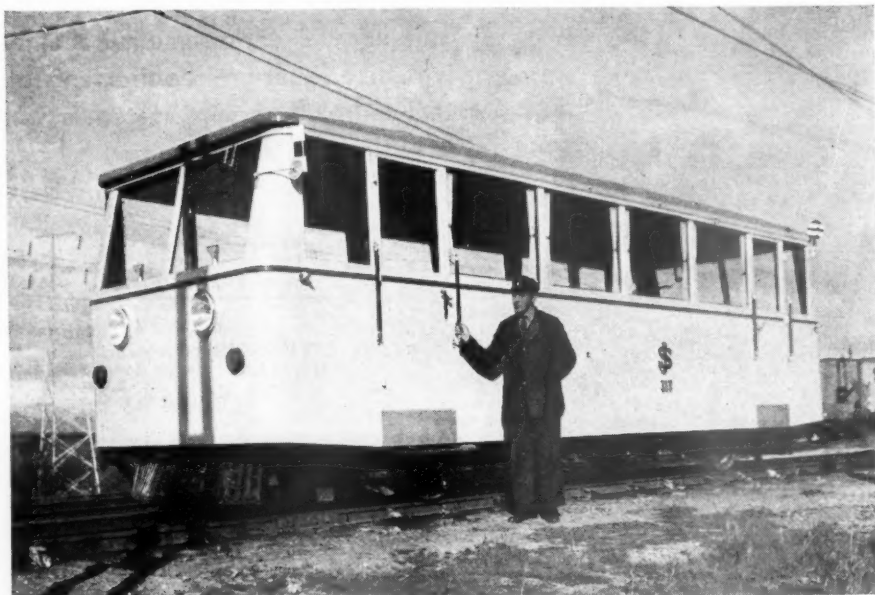
H. W. Miller has been appointed general agent in the freight department of the New York Central, with headquarters at Seattle, Wash., succeeding A. W. Casels, deceased.

M. M. Terrill, chief of the tariff bureau of the Green Bay & Western, has been appointed to the newly-created position of assistant general freight agent, with headquarters as before at Green Bay, Wis.

### PURCHASES AND STORES

V. R. Naylor, district material inspector on the Southern Pacific at Sacramento, Cal., has been appointed to the newly-created position of general inspector of stores, with headquarters at San Francisco, Cal.

\* \* \* \*



Courtesy: American-Swedish News Exchange, Inc.

#### New Rail Bus Developed in Sweden

Weighing 6.2 tons, this vehicle has a wheel base of 15 ft., a width of 7.5 ft. and an over-all length of 26.5 ft. Its power plant is a 100 hp. gasoline engine and it is capable of traveling 50 m.p.h. The rail bus in service in northern Sweden, primarily to accommodate sports enthusiasts.

# Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from 145 Monthly Reports of Revenues and Expenses Representing 149 Class I Steam Railways

FOR THE MONTH OF APRIL, 1935 AND 1934

Item	United States		Eastern District		Southern District		Western District	
	1935	1934	1935	1934	1935	1934	1935	1934
Average number of miles operated .....	237,992	239,129	59,021	59,085	45,248	45,450	133,723	134,594
Revenues:								
Freight .....	\$221,968,160	\$214,280,943	\$96,684,872	\$94,193,492	\$43,838,227	\$44,093,618	\$81,445,061	\$75,993,833
Passenger .....	27,180,736	27,044,887	16,252,419	16,337,311	3,836,032	3,824,467	7,092,285	6,883,109
Mail .....	7,605,534	7,402,352	2,956,289	2,866,440	1,336,803	1,314,804	3,312,442	3,221,108
Express .....	5,372,952	5,082,406	2,069,294	2,137,263	1,473,171	1,259,884	1,830,487	1,685,259
All other transportation ..	6,613,327	6,126,599	3,318,411	3,252,091	726,090	645,710	2,568,826	2,228,798
Incidental .....	5,368,795	4,963,113	2,887,873	2,756,603	933,144	817,797	1,547,778	1,388,713
Joint facility—Cr. ....	757,361	712,991	246,212	236,634	174,097	158,695	337,052	317,662
Joint facility—Dr. ....	214,902	207,355	53,228	52,302	17,332	11,540	144,342	143,513
Railway operating revenues .....	274,651,963	265,405,936	124,362,142	121,727,532	52,300,232	52,103,435	97,989,589	91,574,969
Expenses:								
Maintenance of way and structures .....	30,810,087	30,137,916	11,506,332	11,730,744	6,298,589	5,984,798	13,005,166	12,422,374
Maintenance of equipment* ..	55,247,111	55,124,794	24,385,142	25,469,134	10,529,636	10,180,962	20,332,333	19,474,698
Traffic .....	8,070,705	7,289,551	2,936,474	2,713,704	1,532,480	1,406,365	3,601,751	3,169,482
Transportation .....	102,219,877	93,589,066	47,156,290	44,287,738	17,462,811	16,013,066	37,600,776	33,288,262
Miscellaneous operations ..	2,463,860	2,080,272	1,143,695	1,050,091	329,147	272,944	991,018	757,237
General .....	a 10,698,342	b 12,185,009	5,631,835	5,324,595	1,409,403	2,084,595	3,657,104	4,775,819
Transportation for investment—Cr. ....	182,159	203,339	26,846	66,178	23,192	21,422	132,121	115,739
Railway operating expenses .....	209,327,823	200,203,269	92,732,922	90,509,828	37,538,874	35,921,308	79,056,027	73,772,133
Net revenue from railway operations .....	65,324,140	65,202,667	31,629,220	31,217,704	14,761,358	16,182,127	18,933,562	17,802,836
Railway tax accruals .....	20,524,477	21,383,217	8,551,944	8,840,718	4,258,383	4,323,306	7,714,150	8,219,193
Uncollectible railway revenues .....	66,488	98,855	26,196	57,446	5,087	10,333	35,205	31,076
Railway operating income .....	44,733,175	43,720,595	23,051,080	22,319,540	10,497,888	11,848,488	11,184,207	9,552,567
Equipment rents—Dr. balance ..	7,198,729	8,215,341	3,466,884	4,327,425	821,561	828,966	2,910,284	3,058,950
Joint facility rent—Dr. balance ..	2,908,660	3,071,314	1,701,079	1,694,037	241,988	382,836	965,593	994,441
Net railway operating income .....	34,625,786	32,433,940	17,883,117	16,298,078	9,434,339	10,636,686	7,308,330	5,499,176
Ratio of expenses to revenues (per cent) .....	76.22	75.43	75.57	74.35	71.78	68.94	80.68	80.56
* Includes:								
Depreciation .....	15,718,442	15,517,258	6,949,520	6,847,828	2,877,021	2,913,168	5,891,901	5,756,262
Retirements .....	137,630	425,775	53,648	128,223	37,468	106,347	46,514	191,205
Maintenance of equipment before depreciation and retirements .....	39,391,039	39,181,761	17,381,974	18,493,083	7,615,147	7,161,447	14,393,918	13,527,231
Net railway operating income before depreciation and retirements ..	50,481,858	48,376,973	24,886,285	23,274,129	12,348,828	13,656,201	13,246,745	11,446,643

FOR FOUR MONTHS ENDED WITH APRIL, 1935 AND 1934

Item	United States		Eastern District		Southern District		Western District	
	1935	1934	1935	1934	1935	1934	1935	1934
Average number of miles operated .....	238,066	239,326	59,015	59,126	45,261	45,468	133,790	134,732
Revenues:								
Freight .....	\$867,606,481	\$865,759,550	\$387,988,155	\$387,455,974	\$176,871,501	\$180,713,890	\$302,746,825	\$297,589,686
Passenger .....	112,631,148	107,061,034	66,525,369	65,058,193	17,078,578	15,750,316	29,027,201	26,252,525
Mail .....	30,017,898	30,104,433	11,522,784	11,692,218	5,340,267	5,315,832	13,154,847	13,096,383
Express .....	16,275,720	16,894,774	6,003,272	6,861,823	4,431,690	4,198,812	5,840,758	5,834,139
All other transportation ..	25,289,780	23,922,975	12,901,495	12,711,160	2,681,029	2,421,075	9,707,256	8,790,740
Incidental .....	20,633,526	19,232,740	11,286,341	10,638,510	3,500,195	3,131,135	5,846,990	5,463,095
Joint facility—Cr. ....	3,104,530	2,862,402	1,020,191	939,580	645,787	618,322	1,438,552	1,304,500
Joint facility—Dr. ....	849,998	759,614	241,907	204,613	67,271	59,456	540,820	495,545
Railway operating revenues .....	1,074,709,085	1,065,078,294	497,005,700	495,152,845	210,481,776	212,089,926	367,221,609	357,835,523
Expenses:								
Maintenance of way and structures .....	111,833,489	108,940,267	44,078,854	44,889,760	24,240,551	22,921,483	43,514,084	41,129,024
Maintenance of equipment† ..	220,391,309	215,910,639	99,578,385	100,021,094	42,205,123	40,373,077	78,607,801	75,516,468
Traffic .....	30,520,698	28,968,262	11,390,543	10,996,524	6,041,402	5,643,605	13,088,753	12,428,133
Transportation .....	407,706,716	383,585,407	191,061,847	184,764,413	69,633,308	65,025,675	147,011,561	133,795,319
Miscellaneous operations ..	9,777,838	8,570,330	4,666,432	4,321,597	1,424,160	1,195,429	3,687,246	3,053,304
General .....	e 54,283,634	f 48,634,862	23,046,657	21,317,038	8,592,144	8,256,905	22,644,833	19,060,919
Transportation for investment—Cr. ....	711,053	664,114	131,220	192,575	94,848	68,557	484,985	402,982
Railway operating expenses .....	833,802,631	793,945,653	373,691,498	366,017,851	152,041,840	143,347,617	308,069,293	284,580,185
Net revenue from railway operations .....	240,906,454	271,132,641	123,314,202	129,134,994	58,439,936	68,742,309	59,152,316	73,255,338
Railway tax accruals .....	80,553,256	83,920,328	32,710,031	34,084,759	17,204,258	17,287,005	30,638,967	32,548,564
Uncollectible railway revenues .....	300,078	368,664	113,500	189,565	41,707	67,798	144,871	111,301
Railway operating income .....	160,053,120	186,843,649	90,490,671	94,860,670	41,193,971	51,387,506	28,368,478	40,595,473
Equipment rents—Dr. balance ..	27,084,147	29,711,040	13,519,488	14,925,556	1,778,724	2,657,135	11,785,935	12,128,349
Joint facility rent—Dr. balance ..	11,686,072	12,002,535	6,752,175	6,648,768	1,118,481	1,451,428	3,815,416	3,902,339
Net railway operating income .....	121,282,901	145,130,074	70,219,008	73,286,346	38,296,766	47,278,943	12,767,127	24,564,785
Ratio of expenses to revenues (per cent) .....	77.58	74.54	75.19	73.92	72.24	67.59	83.89	79.53
† Includes:								
Depreciation .....	63,718,907	62,081,269	27,683,508	27,292,041	12,377,644	11,735,012	23,657,755	23,054,216
Retirements .....	425,009	1,483,823	162,683	433,020	117,858	417,192	144,468	633,611
Maintenance of equipment before depreciation and retirements .....	156,247,393	152,345,547	71,732,194	72,296,033	29,709,621	28,220,873	54,805,578	51,828,641
Net railway operating income before depreciation and retirements ..	185,426,817	208,695,166	98,065,199	101,011,407	50,792,268	59,431,147	36,569,350	48,252,612

a Includes accruals on account of pensions, as follows: Under Railroad Retirement Act, a credit of \$3,730,451; under previously existing plan, \$2,893,763, but excludes pension accruals held in suspense and not charged to operating expenses.

b Includes accruals on account of pensions, under previously existing plan, \$2,928,207.

c Includes accruals on account of pensions, as follows: Under Railroad Retirement Act, \$4,400,799; under previously existing plan, \$11,599,909, but excludes pension accruals held in suspense and not charged to operating expenses.

f Includes accruals on account of pensions, under previously existing plan, \$11,627,035.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.



## Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of April,

Region, road, and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line				
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross Excluding locomotives and tenders	Net Revenue and non-revenue	Service-able	Un-service-able	Per cent un-service-able	Stored	
New England Region:													
Boston & Albany.....	1935	402	124,172	128,742	8,671	3,083	68.6	162,057	56,665	54	41	43.1	13
	1934	402	128,263	133,189	9,203	3,296	67.6	169,833	56,194	66	36	35.6	17
Boston & Maine.....	1935	2,008	277,232	311,619	30,254	9,323	67.9	508,742	184,529	100	127	55.8	3
	1934	2,022	260,354	296,821	28,065	9,145	69.2	488,774	179,588	129	149	53.7	15
N. Y., New H. & Hartf.....	1935	2,045	334,270	408,268	20,218	11,144	64.6	613,675	220,916	193	110	36.5	21
	1934	2,045	353,987	430,066	20,492	11,545	64.0	589,003	210,615	198	156	44.2	9
Great Lakes Region:													
Delaware & Hudson.....	1935	835	203,138	283,302	33,842	7,080	61.1	446,473	202,330	244	33	11.9	145
	1934	848	209,116	287,042	36,615	7,093	61.2	447,840	201,592	238	34	12.5	130
Del., Lack. & Western.....	1935	992	344,353	385,529	49,415	10,616	63.8	656,004	256,350	176	81	31.5	48
	1934	992	354,404	392,375	47,633	11,220	63.8	660,728	250,423	180	79	30.5	38
Erie (incl. Chi. & Erie).....	1935	2,305	616,211	640,768	36,112	25,863	64.6	1,529,238	563,382	298	181	37.7	95
	1934	2,315	655,775	685,204	56,669	26,664	61.7	1,627,064	591,017	298	192	39.3	56
Grand Trunk Western.....	1935	1,007	243,088	245,132	1,750	6,688	60.7	399,485	129,451	75	69	48.0	..
	1934	1,007	239,165	240,539	2,363	6,241	58.4	384,369	124,890	72	80	52.6	..
Lehigh Valley.....	1935	1,335	378,095	400,025	37,554	11,593	63.7	730,100	294,793	159	148	48.2	12
	1934	1,335	388,186	406,256	36,049	11,823	64.8	698,122	269,497	175	142	44.6	12
Michigan Central.....	1935	1,971	408,352	409,275	20,234	13,673	59.9	804,186	245,196	132	46	26.0	23
	1934	1,967	437,627	438,412	18,368	14,707	59.1	863,863	260,339	141	42	23.0	21
New York Central.....	1935	6,385	1,367,528	1,451,812	102,381	47,458	59.9	3,003,975	1,196,947	521	449	46.3	52
	1934	6,418	1,423,131	1,515,005	101,746	51,221	59.9	3,186,032	1,256,982	587	487	45.4	32
New York, Chi. & St. L.....	1935	1,661	413,765	416,819	4,403	13,824	62.2	819,879	292,044	144	36	20.3	53
	1934	1,661	478,958	483,345	4,879	14,460	59.8	874,368	302,705	119	49	29.2	15
Pere Marquette.....	1935	2,096	341,786	362,871	3,580	8,814	59.9	554,572	199,358	112	42	27.0	5
	1934	2,119	367,623	385,598	3,565	8,939	57.2	584,223	209,807	118	38	24.4	4
Pitts. & Lake Erie.....	1935	234	55,325	57,931	42	1,940	54.6	161,081	83,141	31	40	56.4	10
	1934	234	59,713	61,122	92	2,220	55.5	188,796	100,694	31	41	56.8	6
Wabash.....	1935	2,435	551,235	558,596	11,388	16,842	60.7	983,987	310,040	158	175	52.5	28
	1934	2,445	547,066	554,852	11,209	16,466	59.6	986,907	306,201	163	180	52.4	51
Central Eastern Region:													
Baltimore & Ohio.....	1935	6,321	1,232,410	1,470,299	152,296	35,308	60.6	2,327,533	975,455	704	608	46.3	137
	1934	6,263	1,248,302	1,500,228	155,556	36,111	61.5	2,346,081	992,805	698	623	47.2	72
Big Four Lines.....	1935	2,711	538,403	552,205	20,911	15,423	61.2	960,909	398,536	177	142	44.5	42
	1934	2,655	542,371	558,974	21,487	15,597	60.9	969,952	400,978	204	146	41.7	22
Central of New Jersey.....	1935	684	137,409	154,388	28,223	4,706	58.8	327,258	154,943	72	85	54.3	16
	1934	690	136,163	151,046	28,087	4,418	58.1	303,034	138,816	85	87	50.7	25
Chicago & Eastern Ill.....	1935	939	148,768	149,976	2,454	3,469	60.0	222,473	86,613	49	59	54.9	7
	1934	939	159,502	160,253	2,451	3,451	60.2	224,214	89,877	57	111	66.0	11
Elgin, Joliet & Eastern.....	1935	446	87,029	88,027	1,181	2,000	58.7	154,642	74,671	57	29	33.4	4
	1934	446	81,386	83,168	1,492	1,937	59.0	151,939	73,885	65	24	27.5	11
Long Island.....	1935	393	32,524	33,539	14,851	329	53.3	25,301	10,448	32	21	38.8	..
	1934	396	29,120	29,734	13,770	311	54.4	22,350	8,695	30	27	47.3	..
Pennsylvania System.....	1935	10,009	2,451,822	2,713,959	275,718	83,604	61.4	5,464,336	2,296,319	1,385	1,036	42.8	242
	1934	10,088	2,534,754	2,817,103	302,932	85,467	60.8	5,705,827	2,433,859	1,432	967	40.3	277
Reading.....	1935	1,452	372,113	407,643	47,067	10,426	59.1	743,526	346,084	272	97	26.4	88
	1934	1,454	385,516	421,782	45,348	10,634	58.8	754,489	346,544	256	130	33.7	72
Pocahontas Region:													
Chesapeake & Ohio.....	1935	3,057	718,489	751,076	27,697	28,950	54.2	2,431,886	1,260,168	410	93	18.5	111
	1934	3,106	768,228	809,466	32,062	31,953	54.7	2,701,944	1,429,100	458	97	17.5	130
Norfolk & Western.....	1935	2,146	528,160	551,005	23,072	19,824	58.8	1,560,488	778,800	342	36	9.5	126
	1934	2,164	554,722	579,920	27,373	21,468	59.2	1,749,052	912,565	415	53	11.4	176
Southern Region:													
Atlantic Coast Line.....	1935	5,148	603,279	606,588	8,430	12,588	58.8	690,706	221,871	305	129	29.8	44
	1934	5,145	571,704	572,982	7,539	11,931	62.3	635,196	215,836	322	131	28.9	72
Central of Georgia.....	1935	1,886	226,332	227,902	3,426	4,972	68.3	272,982	103,118	98	42	30.2	..
	1934	1,886	216,308	217,316	3,044	4,682	67.7	256,371	96,231	95	44	31.4	..
Illinois Central (incl. Y. & M. V.).....	1935	6,587	1,348,551	1,355,734	26,663	31,318	61.0	1,974,170	764,156	610	318	34.3	5
	1934	6,618	1,302,750	1,318,100	24,040	29,280	58.5	1,895,139	715,801	593	332	35.9	1
Louisville & Nashville.....	1935	5,046	912,484	983,463	24,204	19,299	57.2	1,347,444	600,646	319	262	45.1	15
	1934	5,067	907,738	968,329	23,637	19,603	59.0	1,341,662	612,651	308	304	49.7	10
Seaboard Air Line.....	1935	4,295	509,852	526,050	4,438	12,406	61.4	730,051	233,212	178	98	35.5	4
	1934	4,297	489,034	504,862	3,959	11,987	62.8	701,767	241,527	208	75	26.5	..
Southern.....	1935	6,599	1,062,738	1,076,856	17,184	24,213	64.7	1,332,005	485,013	560	288	34.0	92
	1934	6,599	1,119,298	1,135,739	17,208	25,363	65.1	1,400,210	517,797	614	298	32.7	113
Northwestern Region:													
Chi. & North Western.....	1935	8,428	843,297	887,204	21,155	21,496	64.3	1,269,413	429,920	509	267	34.4	115
	1934	8,443	908,556	951,959	20,709	22,867	62.5	1,357,353	468,790	572	240	29.5	143
Chicago Great Western.....	1935	1,456	226,623	226,875	3,517	6,510	58.9	407,135	140,139	65	37	36.0	..
	1934	1,463	211,364	212,191	13,495	6,621	58.9	407,822	136,142	61	35	36.1	..
Chi., Milw., St. P. & Pac.....	1935	11,118	1,135,330	1,195,470	51,343	29,758	60.6	1,831,517	689,855	482	198	29.1	113
	1934	11,157	1,080,107	1,141,640	51,297	28,631	61.8	1,753,746	677,616	530	345	39.4	178
Chi., St. P., Minneap. & Om.....	1935	1,644	182,512	187,978	8,172	3,894	64.6	232,543	86,747	111	47	29.6	56
	1934	1,653	194,570	198,492	8,646	4,279	64.8	248,995	98,412	125	30	19.3	59
Great Northern.....	1935	8,254	646,208	652,469	24,700	20,781	65.6	1,284,630	552,170	423	183	30.2	90
	1934	8,335	560,004	564,415	16,714	17,282	68.1	1,033,555	444,612	428	170	28.5	113
Minneap., St. P. & S. St. M.....	1935	4,274	336,547	341,759	3,167	7,412	64.4	415,644	160,264	111	38	25.6	..
	1934	4,281	327,837	332,698	2,516	7,203	64.3	412,251	163,271	122	43	25.9	..
Northern Pacific.....	1935	6,416	554,387	620,691	45,060	18,321	69.2	1,041,856	434,047	353	98	21.8	58
	1934												

## 1935, Compared with April, 1934, for Roads with Annual Operating Revenues Above \$25,000,000

Region, road, and year	Average number of freight cars on line			Per cent un-service-able	Gross ton-miles per train-hour, excluding locomotives and tenders		Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
	Home	Foreign	Total		Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders							
New England Region:													
Boston & Albany.....1935	2,876	4,013	6,889	24.7	21,747	1,305	456	18.4	274	21.7	4,702	158	48.0
.....1934	3,039	3,462	6,501	24.2	22,270	1,324	438	17.0	288	25.0	4,663	153	46.4
Boston & Maine.....1935	8,793	7,224	16,017	14.7	25,797	1,835	666	19.8	384	28.6	3,063	107	50.2
.....1934	8,606	7,132	15,738	15.3	26,578	1,877	690	19.6	380	28.0	2,961	105	39.0
N. Y., New H. & Hartf.....1935	15,611	11,094	26,705	14.2	26,121	1,836	661	19.8	276	21.5	3,601	107	47.1
.....1934	14,836	10,610	25,446	13.1	25,254	1,664	595	18.2	276	23.6	3,434	112	42.4
Great Lakes Region:													
Delaware & Hudson.....1935	11,496	2,787	14,283	4.5	29,132	2,198	996	28.6	472	27.0	8,074	115	38.2
.....1934	11,259	2,788	14,047	4.2	28,230	2,142	964	28.4	478	27.5	7,922	114	39.6
Del., Lack. & Western.....1935	16,730	4,576	21,306	12.6	31,806	1,905	744	24.1	401	26.0	8,615	135	56.3
.....1934	16,900	4,706	21,606	11.4	28,357	1,864	707	22.3	386	27.1	8,416	151	56.7
Erie (incl. Chi. & Erie).....1935	24,032	12,196	36,228	6.5	41,294	2,482	914	21.8	518	36.8	8,147	98	47.1
.....1934	29,425	14,912	44,337	4.7	40,712	2,481	901	22.2	444	32.5	8,509	103	50.5
Grand Trunk Western.....1935	4,208	7,816	12,024	17.9	31,931	1,643	533	19.4	359	30.6	4,286	101	57.0
.....1934	4,676	9,726	14,402	18.2	30,552	1,607	522	20.0	289	24.7	4,135	105	53.3
Lehigh Valley.....1935	14,269	5,045	19,314	9.0	34,584	1,931	780	25.4	509	31.4	7,359	133	47.6
.....1934	18,193	6,016	24,209	20.3	32,311	1,798	694	22.8	371	25.1	6,730	136	46.6
Michigan Central.....1935	16,652	20,945	37,597	11.6	36,542	1,969	600	17.9	217	20.2	4,146	108	80.3
.....1934	20,177	22,137	42,314	8.1	36,751	1,974	595	17.7	205	19.6	4,412	107	83.4
New York Central.....1935	49,495	59,940	109,435	22.4	36,060	2,197	875	25.2	365	24.1	6,249	103	53.4
.....1934	61,823	59,981	121,804	21.4	36,803	2,239	883	24.5	344	23.4	6,529	103	50.2
New York, Chi. & St. L.....1935	8,975	6,175	15,150	3.9	36,400	1,982	706	21.1	643	48.9	5,862	93	77.9
.....1934	8,479	7,425	15,904	4.2	33,345	1,826	632	20.9	634	50.7	6,076	101	96.5
Pere Marquette.....1935	10,750	5,692	16,442	3.6	27,434	1,623	583	22.6	404	29.8	3,171	98	79.3
.....1934	11,094	5,912	17,006	2.6	27,326	1,589	571	23.5	411	30.6	3,300	98	83.4
Pitts. & Lake Erie.....1935	14,808	8,738	23,546	42.0	41,839	2,912	1,503	42.9	118	5.0	11,860	117	27.1
.....1934	16,957	10,290	27,247	31.4	43,272	3,162	1,686	45.4	123	4.9	14,364	108	28.5
Wabash.....1935	12,199	8,730	20,929	4.7	37,167	1,785	562	18.4	494	44.2	4,245	115	57.1
.....1934	13,330	9,262	22,592	4.2	37,414	1,804	560	18.6	452	40.8	4,175	114	55.0
Central Eastern Region:													
Baltimore & Ohio.....1935	77,116	21,241	98,357	17.7	25,775	1,889	792	27.6	331	19.7	5,144	151	41.2
.....1934	80,638	21,447	102,085	18.0	25,560	1,879	595	27.5	324	19.2	5,284	156	41.8
Big Four Lines.....1935	13,654	22,955	36,609	12.4	31,936	1,785	740	25.8	363	23.0	4,901	119	59.9
.....1934	18,203	22,969	41,172	13.9	32,192	1,788	739	25.7	325	20.7	5,035	120	55.3
Central of New Jersey.....1935	12,828	7,982	20,810	27.8	29,672	2,382	1,128	32.9	248	12.8	7,551	144	38.8
.....1934	16,642	6,902	23,544	33.7	26,699	2,226	1,019	31.4	197	10.8	6,707	157	34.8
Chicago & Eastern Ill.....1935	3,573	2,439	6,012	8.3	27,075	1,495	582	25.0	480	32.0	3,075	131	47.0
.....1934	5,834	2,280	8,114	25.3	25,490	1,406	563	26.0	369	23.5	3,191	134	32.2
Elgin, Joliet & Eastern.....1935	8,014	2,828	10,842	8.9	17,223	1,777	858	37.3	230	10.5	5,579	123	34.6
.....1934	9,126	3,454	12,580	25.5	17,003	1,867	908	38.1	196	8.7	5,521	120	31.7
Long Island.....1935	768	3,509	4,277	3.3	5,872	778	321	31.8	81	4.8	887	298	30.5
.....1934	773	3,330	4,103	2.1	6,181	768	299	28.0	71	4.6	732	285	25.6
Pennsylvania System.....1935	237,947	44,747	282,694	14.8	32,646	2,229	937	27.5	271	16.0	7,647	122	41.2
.....1934	244,832	47,566	292,398	12.5	32,815	2,251	960	28.5	277	16.0	8,042	127	43.4
Reading.....1935	32,055	8,391	40,446	7.4	25,303	1,998	930	33.2	285	14.5	7,945	158	41.1
.....1934	35,696	8,174	43,870	15.4	23,578	1,957	899	32.6	263	13.7	7,946	158	40.3
Pocahontas Region:													
Chesapeake & Ohio.....1935	43,756	11,159	54,915	1.7	48,487	3,385	1,754	43.5	765	32.4	13,740	80	51.6
.....1934	41,615	10,531	52,146	1.6	49,821	3,517	1,860	44.7	914	37.3	15,337	79	50.5
Norfolk & Western.....1935	33,072	4,032	37,104	2.5	44,130	2,955	1,475	39.3	700	30.3	12,096	112	50.7
.....1934	35,242	4,311	39,553	3.7	47,395	3,153	1,645	42.5	769	30.6	14,057	107	43.3
Southern Region:													
Atlantic Coast Line.....1935	23,730	7,055	30,785	20.9	20,298	1,145	368	17.6	240	23.2	1,437	114	47.2
.....1934	26,268	7,021	33,289	25.0	19,605	1,111	378	18.1	216	19.2	1,398	120	42.7
Central of Georgia.....1935	6,511	2,240	8,751	25.3	22,150	1,206	456	20.7	393	27.7	1,823	128	55.1
.....1934	7,000	2,203	9,203	25.3	21,292	1,185	445	20.6	349	25.1	1,701	130	52.8
Illinois Central (incl. Y. & M. V.).....1935	44,264	15,088	59,352	33.7	25,611	1,464	567	24.4	429	28.8	3,867	136	49.7
.....1934	52,904	14,251	67,155	39.1	25,465	1,455	549	24.4	355	24.8	3,605	140	48.4
Louisville & Nashville.....1935	44,750	7,777	52,527	31.3	23,536	1,477	658	31.1	381	21.4	3,967	146	57.8
.....1934	48,067	7,909	55,976	30.4	23,032	1,478	675	31.3	365	19.8	4,030	143	54.0
Seaboard Air Line.....1935	11,446	5,298	16,744	3.9	24,108	1,432	457	18.8	464	40.2	1,810	119	64.1
.....1934	11,864	6,497	18,361	5.8	23,258	1,435	494	20.1	438	34.6	1,874	118	59.9
Southern.....1935	27,515	15,358	42,873	15.1	21,015	1,253	456	20.0	377	29.1	2,450	150	43.0
.....1934	31,906	14,855	46,761	16.6	20,854	1,251	463	20.4	369	27.8	2,615	154	42.2
Northwestern Region:													
Chi. & North Western.....1935	40,578	19,323	59,901	8.4	22,784	1,505	510	20.0	239	18.6	1,700	133	39.0
.....1934	42,617	17,525	60,142	11.1	23,804	1,494	516	20.5	260	20.3	1,851	131	39.9
Chicago Great Western.....1935	2,428	2,732	5,160	4.8	33,462	1,797	618	21.5	905	71.4	3,208	130	75.7
.....1934	2,378	2,622	5,000	2.9	34,997	1,929	644	20.6	908	74.9	3,102	136	78.5
Chi., Milw., St. P. & Pac.....1935	50,881	14,622	65,503	2.9	25,711	1,613	608	23.2	351	25.0	2,068	127	61.2
.....1934	56,050	13,955	70,005	5.4	25,437	1,624	627	23.7	323	22.0	2,024	125	45.4
Chi., St. P., Minneap. & Om.....1935	2,038	6,503	8,541	11.0	18,274	1,274	475	22.3	339	23.5	1,759	121	41.5
.....1934	2,055	6,480	8,535	11.7	18,380	1,280	506	23.0	384	25.8	1,985	106	45.6
Great Northern.....1935	41,929	8,821	50,750	8.9	29,972	1,988	854	26.6	363	20.8	2,230	130	37.3
.....1934	42,317	8,661	50,978	7.9	27,493	1,846	794	25.7	291	16.6	1,778	128	32.4
Minneap., St. P. & S. St. M.....1935	13,883	3,169	17,052	5.5	19,512	1,235	476	21.6	314	22.5	1,250	112	77.2
.....1934	16,												

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